RAILROAD GAZETTE

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Contributions.

Pneumatic Interlocking—High or Low Pressure?

Boston, Sept. 5, 1899.

To the Editor of the Railroad Gazette:

I have read Mr. F. L. Dodgson's comments of August 11 [page 563] upon my article in your issue of July 21, on the Boston Southern Station. That article, in a description of this station's interlocking, endeavored to answer in part a number of questions relating to it that were prompted, no doubt, by the recent introduction at Buffalo, N. Y., of an interlocking that employs compressed air at but 15 lbs. pressure, and which was designed originally with a view of eliminating electricity from its composition entirely. In this I seem to have opposed some principles held exempt from criticism by the low pressure advocate, whose protest involves some calculations that probably represent the value of his general conclusions.

1. He asserts that a 10 in. cylinder of 9 in. stroke, under pressure of 15 lbs., is the mechanical equivalent of a 5 in. cylinder of equal (9 in.) stroke, under 80 lbs. pressure. 2. He asserts that each operation of the cylinders represents a consumption of air equal to .405 h. p. for the 10 in. and .996 h. p. for the 5 in.

As to the first assertion: The 5 in. cylinder is much more powerful under 80 lbs. than is the 10 in. one under 15 lbs., and it is equivalent to the latter in mechanical energy when under 60 lbs. pressure, instead of 80. As to the power needed for one stroke, a 5 in. cylinder of 9 in. stroke consumes in air at 80 lbs. .11 h. p. at each operation; while a 10 in. cylinder of 9 in. stroke consumes in air at 15 lbs. .04 h. p.—about one-tenth of that attributed to each. Nevertheless, though wrong in amounts, these figures are practically correct as to ratio of energies consumed when those of the cylinders only are considered; then, as he states, the low pressure has the advantage of about 50% in efficiency, but this is somewhat lessened by correcting the first error mentioned.

However, unlike the electro-pneumatic system, the "all-air" method exhausts the air from something more than the cylinder at each operation of a switch. *It exhausts the contents of a ¼ in pipe that extends from the cylinder to the tower*, containing air at 5 lbs. pressure. This pipe may be from 100 to 2,000 ft. in length, depending upon the magnitude of the plant and the relation of tower to switches. Where conditions most fully warrant power interlocking, these lengths are greatest, and the speed of the apparatus and the economy of its power are most seriously impaired.

Four hundred feet is not an unfair average length of pipe to take for illustration of the energy thus consumed during each movement of the switch operated by the all-air low-pressure system. Such a pipe contains .56 cu. ft. of air at 5 lbs. pressure, or .74 cu. ft. at atmospheric pressure. Its 10 in. operating cylinder contains .41 cu. ft. at 15 lbs., or .82 cu. ft. at atmospheric pressure. The pipe and cylinder, therefore, contain the equivalent of 1.56 cu. ft. of free air, which raised to 15 lbs. = .078 h. p.—the actual energy consumed by each operation of a low pressure switch of average distance from the tower, the largest percentage of which power is contained in the pipe, and hence wasted.

The 5 in. cylinder of the electro-pneumatic system contains (at 9 in. stroke) .1023 cu. ft. of air at 60 lbs. (when equivalent in mechanical energy to the 10 in. one employed by the all-air system) and hence, the equivalent of .51 cu. ft. at atmospheric pressure.

We have, therefore, the following, when the energy necessary to raise 1 cu. ft. of free air to 15 lbs. is .05 h. p. To raise it to 60 lbs. requires .134 h. p.

Diameter.	Stroke.	Cubical Contents.	Pressure.	Equivalent in Free Air to		Raised to	Represents, in H. P.
High— 5 in.	9 in.	1023	60	.51 cu. ft.		60 lbs.	.068
Low — 10 in.	9 in.	.41	15	.82	1.56 cu. ft.	15 lbs.	.078
Pipe ½ in.	400 ft. Long.	.56	5	.74			

Greater economy in air consumption is, therefore, not secured by the use of low pressure, in Mr. Dodgson's system, than is secured in the electro-pneumatic employing 60 lbs. pressure.

A reduction from 60 to 15 lbs. in the working pressure of the electro-pneumatic system is possible, however, by substituting 10 in. for 5 in. cylinders, and a material increase in efficiency of air consumption above that shown in the table is obtained. This, however, is not desirable unless the application of compressed air to switch and signal operation is to be confined to the limited field thus far entered by Mr. Dodgson's system, namely: isolated interlocking plants of small magnitude, each employing separate power plants, and entirely free from those features of track equipment that render power interlocking most desirable—double slip switches with movable frogs made of 100 lb. rails, and equipped with detector bars ½ in. thick.

It is the want of experience in the broader applications of compressed air to railroad service that leads Mr. Dodgson to adopt this low pressure theory and to pronounce the question of transmission "a distinctly negligible quantity." Between Jersey City and Philadelphia, on the Pennsylvania Railroad, is a 2 in. pipe, carrying air at about 70 lbs. pressure, that is maintained by three compressors, and which supplies about 1,000 automatic signals with operating power. How many compressors, or what diameter of main, would be required to maintain, for the same distance and the same service, the energy to operate these signals at 15 lbs. pressure?

If such great virtues lie in low pressures, why does the air brake employ 70 lbs.? And why do not pneumatic rock drills, hoists and kindred tools take advantage of it?

So far, this discussion has been based upon general considerations; let us now look at one of many construction details affected by it. At the Boston Southern station, where 35 double slip switches, each with movable frogs, are operated under the electro-pneumatic system, 35 cylinders are in use (of 6½ in. diam. and 8 in. stroke) each for operating a pair of slip points and a pair of frog points, with 150 ft. of detector bars of ½ in. x 2¼ in. section. These cylinders require as a minimum 75 lbs. per sq. in. to operate these appliances reliably, which means practically 2,500 lbs. exerted by each piston. To perform this work with 15 lbs. would require the use of cylinders of five times their present area—a cylinder of practically 14½ in. diameter.

Mr. Dodgson may feel secure in removing the pressure from his switch shifting mechanism after each movement is completed, and in thereby trusting to the inertia of its several parts alone to retain it in the position last moved to. The writer, however, and he believes the public in general, would repose more confidence in his system if he retained in action the air by which the switch is moved until its reversal is again required. This has always been done in the electro-pneumatic system, even before the electric switch valve became a feature of it, and before the alleged dangers of that device could possibly have been a factor in forcing the adoption of the "continuous pressure" principle advocated by the writer as the safest means of checking false operation due to leaks and sediment during the abnormal conditions these devices naturally get into, or are put into by want of knowledge concerning them on the part of the men entrusted with their care.

Furthermore, the writer feels it incumbent on him to ask Mr. Dodgson why, in the Buffalo installation of his system, it became necessary to attach electric locks to the levers of that apparatus, if not for checking faulty operation of it that he did not anticipate in designing it?

For these locks and kindred devices, this all-air plant employs considerably over one hundred cells of battery—one-half of which the writer is able to remove and to operate with the remainder an electro-pneumatic machine of equal capacity to that machine now in operation at that place.

J. P. COLEMAN.

Meeting of the Roadmasters' Association.

The seventeenth annual meeting of the Roadmasters' Association of America was opened Tuesday morning, September 12, at the Hotel Cadillac, Detroit, Mich. After a brief opening address by Mr. T. Hickey, the President of the Association, the Mayor of Detroit, Mr. W. C. Maybury, spoke. The Secretary read the names of 28 new members, and one member who had resigned.

A letter was received from Mr. J. M. Meade, Atchison, Topeka & Santa Fe, asking that a committee be appointed to compile a set of standards and recommended practice for the Association. After some discussion it was decided that such a committee should be appointed to report at the next meeting.

The election of officers for the ensuing year resulted as follows: President, S. B. Rice, Richmond, Fredericksburg & Potomac; First Vice-President, D. Foley, Michigan Central; Second Vice-President, V. T. Douglas, Chesapeake & Ohio; Secretary and Treasurer, J. B. Dickson, Chicago & Northwestern; new member of the Executive Committee, John Doyle, Chicago & West Michigan. The others of the Executive Committee holding over are: J. A. Lahey, Chicago Terminal Transfer RR.; G. W. Merrell, Norfolk & Western, and C. E. Jones, Chicago, Burlington & Quincy.

A letter was received from Mr. F. R. Coates, of the New York; New Haven & Hartford, proposing a partial consolidation of the Roadmasters' Association, and the Eastern Maintenance of Way Association, under the title of the Railway Maintenance of Way Association, the new organization to hold meetings every two years, first in the eastern and then in the western territory. In alternate years the two present organizations would hold separate meetings and retain their officers. The whole matter was referred to the Executive Committee.

The report printed in our last issue on "Advisability of Increasing the Length of Rails and Using Miter Joints, and the Determination of the Difference in Expansion of Light and Heavy Rails," was then read and opened for discussion. The discussion was brief, and principally on the advisability of using 60-ft. rails, the sense of the meeting being that rails over 33 ft. long could not be recommended at this time.

The Committee in its report raised three objections to 60-ft. rails; that the mills are not at present prepared to straighten these rails; that more labor is required to maintain track laid with them, and that greater opening is required at the joints for expansion than with the shorter rails. Mr. P. E. Carhart, of the Illinois Steel Company, stated that, from the standpoint of the mill, it was impracticable to straighten 60-ft. rails and the cost was greater; that while one man could readily straighten 33-ft. rails, it took four men to handle the 60-ft. lengths, while they deflected so easily under their own weight that after 14 years' experience he would not undertake to say when a 60-ft. rail was straight as it lay on the supports. It was his opinion, that it requires fewer blows to straighten a 30-ft. rail of standard section than rails of any other length or section, and that it is desirable to do as little work as possible in straightening so as to avoid injuring the steel under the press. Several members stated that long rails are not kinked in shipping if properly loaded. Mr. Peter Clark, of the Philadelphia & Reading, had been informed that the Pennsylvania RR. was about to abandon the use of long rails after an extended trial. Mr. D. Foley, of the Michigan Central, was in favor of 60-ft. rails, and stated that less labor was required to maintain track laid with them, although this was contrary to the findings of the Committee. He had had several sections of 60-ft. rails in the track, and had found no trouble from expansion. In his opinion long rails could be laid with the ends close together, if expansion joints capable of allowing for 4½ in. variation were placed every 500 ft. Experiments had been made on the Michigan Central with several sections of track laid in this way, and an expansion joint had been developed which had given satisfactory results. His experience with 60 ft. rails did not warrant any opinion as to their creeping.

The report, "Standard Right of Way Fences," extracts from which were given last week, was received and the recommendation approved. The recommendation of the Committee was a 5-ft. woven wire fence with 11 horizontal wires, the top and bottom wires being No. 7, and the intermediate and vertical wires No. 11 gage; the vertical wires to be placed 1 ft. apart and the posts spaced 16½ ft. center to center. It was pointed out during the discussion that some States had passed laws governing the construction of railroad fences; for instance, Missouri, Arkansas and Michigan required a combination board and wire fence. The position was taken, however, that the fence proposed by the Committee represented good practice and was to be recommended.

Mr. W. T. Manning, Consulting Engineer of the Baltimore & Ohio, was introduced, and gave a brief talk on rail wear and described the new unsymmetrical rail section he has patented and that is being tried on the Baltimore & Ohio.* Some short pieces of these rails were exhibited. Among other things Mr. Manning said that the present heavy steel rails were inferior in wearing qualities to the light rails rolled several years ago. The reason for this was that the heavy rails do not get the work put into them in rolling that lighter ones do. The same size billet is used for both sections, and the heavier rail is therefore not reduced so much and comes out hotter than the light rail. Because of this and the

* See Railroad Gazette, July 20, 1894, and January 27, 1899.

heavier rolling stock now used, he held that a modification of the standard section is advisable.

The topic, "Tie Preservation," was brought up for discussion, but further than that it was shown that a good many roads are taking up this question, and are using treated ties, nothing of general interest was brought out. The creosote process seemed to be preferred. When failure has occurred, it has usually been with timber treated before seasoning, and where insufficient pressure has been used during the process of injection, so that the solution did not reach the center of the timber; in such cases the tendency is for the center of the timber to rot within a few years, leaving a hard, hollow shell. In recent years, however, these faults in the process of treating timber have been remedied.

The second session began with a paper by Mr. Sullivan, of the Michigan Central, entitled "Embellishment of Station Grounds," being based on work of this kind done on the Michigan Central. An abstract of this paper is given in this issue. There was considerable discussion of the paper showing that many roads are now giving more attention to cleaning the right-of-way and improving the grounds of the principal stations; some are also treating small stations in a similar way. Mr. C. E. Jones, of the Chicago, Burlington & Quincy, said that he had tried mowing the right-of-way by a machine instead of by hand, and that on a certain 100-ft. right-of-way the machine work cost about one-half as much as the hand work. Several other roads are encouraging farmers to cultivate the right-of-way, as this saves the cost of mowing and cleaning, and lessens the danger from fires. The Atchison, Topeka & Santa Fe and the Chicago & Northwestern employ a landscape gardener, who is responsible for the station grounds, and like the Michigan Central these roads take great pains to improve the appearance of the stations. It was thought the money spent in this way was a good investment, and helped to advertise the road.

The papers, "The Relation of Track to Traffic," by Mr. F. R. Coates, of the New York, New Haven & Hartford, and "Standard Car and Track Gages," by Mr. C. C. Dunn, Atlantic Coast Line, were received without discussion, and ordered printed in the Proceedings. Both of these papers were published by extract in our last issue.

This disposed of all the reports and papers, and at the last session the only business transacted was installing the new officers, and selecting Los Angeles, Cal., as the place for the next meeting. This meeting will be held on the second Tuesday of November instead of the second Tuesday in September, as heretofore.

On Wednesday evening, Mr. E. E. Russell Tratman gave a lecture on recent improvements in track construction and maintenance, which was illustrated by a stereopticon. He referred to improvements in splices, nut locks, switches, frogs, dump cars for ballast, track pile drivers, velocipede and small cars driven by motors, and steel foundations for steam railroad track, the subject of a series of articles by Mr. Gustav Lindenthal in the Railroad Gazette. Between the business meetings several excursions were made to points of interest about Detroit. One of these was to see the working of a new tie-spotting machine designed by Mr. G. M. Brown, of the Flint & Pere Marquette, for use when changing rails or putting in tie plates. This machine cuts grooves in the tie on either side of the rails of such depth that it is only necessary to remove the chip by adzing to get a smooth and even bearing for the new rail or tie plate.

The Traveling Engineers' Association.

Seven reports were presented at the seventh annual meeting of the Traveling Engineers' Association, held at Cincinnati, O., commencing September 12. Extracts from most of these reports follow:

The Use of Water on Hot Bearings of Locomotives and Tenders.

This subject was discussed at the last meeting, when the opinion prevailed that the use of water on hot bearings in an emergency, when the delay of an important train was involved, was a commendable practice. The only difference of opinion at that time seemed to be as to the possible abuse of this practice, and the injury to bearings resulting from the use of water. The present Committee therefore confined its inquiry to the one point of injury to bearings, being satisfied that the last year's report sufficiently covered the other points of the subject.

Prof. W. F. M. Goss in answer to the Committee's inquiry, said that the use of water on bearings will not injure the bearings unless they are very hot before the water is applied; even then the damage should be attributed to the heating rather than to the use of water in cooling. If the water is applied when the bearing first begins to heat, and if used in sufficient quantities to prevent the melting of the babbitt, it is thought that no damage whatever results from its use. Whether the water is used hot or cold is more a question of convenience than otherwise, cold water probably being no more severe in its effect upon the bearing than hot, and other things being equal a smaller quantity of cold water would serve the purpose.

Mr. W. H. Marshall, at that time Assistant Superintendent of Motive Power of the Chicago & Northwestern, said that the practice on the Northwestern was to fit all important passenger locomotives with piping to carry water to engine truck journals, driving axle journals and tender truck journals, and also to provide a pipe for putting water upon the main crank pin journal. Further, it is thought that it would pay to similarly equip important freight locomotives, and this has been done to some extent. No injury to journals has ever been found arising from the proper use of water and none is anticipated if the water is applied in time.

The experience of the Atchison, Topeka & Santa Fe is somewhat different, as given by Mr. G. A. Hancock, Assistant Superintendent of Machinery. On that road so many journals have been destroyed that it has about been concluded to prohibit the use of water, although enginemen on fast runs are now allowed to use it. The trouble seems to be bad judgment on the part of the enginemen.

The Committee concludes from the information at hand, as well as from personal experience, that the use of water on hot bearings in emergency cases is good practice, and that if the enginemen are properly instructed in the use of water and the pipes are properly placed, favorable results will always be had. It is believed that where trouble has occurred from the use of water, it has always been where the enginemen have had no experience or have lacked instructions. It is recommended that locomotives of important trains be equipped with a ¾-in. main supply pipe, with ½-in. laterals, extending to the tops of each driving and engine truck box; each lateral to have a globe valve. On the ends of the laterals a short piece of rubber hose should be used to prevent the water being blown away from the bearing. Care should also be taken to keep the tank free from dirt and other matter that might obstruct the water pipes.

This report is signed by C. A. Crane, Charles Davis, C. A. Dixon, and P. A. Eich.

How Can the Responsible Engineman be Located when an Engine has been Subjected to Unfair Usage under the Pooling System?

It is recommended that enginemen running in the pool be required to carefully inspect the engine at the end of each trip, reporting all the necessary work on a blank provided for the purpose; this report to be given to the Round House foreman, who will forward it to the Master Mechanic when the work is done. If anything requiring especial care or attention has been done on the engine, a note should be left on the engine for the engineman, informing him that certain work was done. Should the foreman be unable to do the work reported by the engineman and the engine be sent out, it should be so stated on the work report blank that the work had not been done, and on what account. There should be a competent man to inspect the engine on its arrival, noting defects, and his report should be given the foreman in charge, or written in a book, that they may be compared with the report of the engineman if found necessary. If the inspector found defects that were not reported by the engineman and ought to have been seen by him when he made his inspection of the engine, a comparison of these two work or condition reports would locate the man who failed to properly inspect and report work on the engine. This would locate the responsible man very easily. Flat tires should be reported on arrival, but if not, and they are not detected by the inspector, the engineman going out should report the size of the spots by wire to the Master Mechanic from the first telegraph station stop. If he does not, he should be held responsible for flat spots, and an investigation usually shows where it occurred. Hot pins or bearings are as a rule caused by neglect of feeders in oil cups, improper oiling and dirty oil. If the engine came in cold, went out and had a hot pin box or eccentric, the engineman should be held responsible unless he could offer satisfactory explanation. If he could not, the case should be taken up by the foreman in charge, Traveling Engineer or Master Mechanic, who would be able to decide where the fault was and who was to blame. All engine failures should be handled in the same manner.

This report is signed by W. G. Wallace, A. L. Fuller, P. H. Stack, E. W. Brown, and A. B. Collins.

The Proper Care of the Air Pump and Engineers' Valve while in Service and What is Essential to the Successful Handling of Air-Brake Trains.

This is a carefully prepared report giving explicit directions as to how air pumps and brake valves should be cared for, and the proper method of handling trains fitted with air brakes. Our space will not permit of publishing the report in full, which is the only way it could be treated to advantage. We would suggest that the heads of mechanical departments secure copies of this paper from the Secretary for those directly interested in this subject. The Committee consisted of A. C. Loucks, S. J. Kidder, D. Meadows, M. H. Neff and H. C. Frazer.

In Employing or Recommending Young Men for Firemen, What Qualifications Should They Possess?

It is the unanimous opinion that the applicant should not be very old, although in many cases there are legal objections in the way of employing anyone as a fireman before the age of 21 years. Where such objections do not exist it is thought that 18 years is a good age for a new man. Some consider it an advantage to start such men as wipers, then using them on the repair force, so as to give them an idea of how the work around an engine is done. There is one objection to this; if a boy is kept too long at this work he gets discontented and shiftless and learns habits which are a trouble to him afterward. Therefore, unless promotion from wiper to fireman comes inside of six months, it is no use to have the young fireman take this course. If there is a force of hostlers employed caring for, firing up and moving the engines in and out of the house, cleaning fires, etc., it is of value to have the young man assist them when possible, as that is more in the line of his future duties.

As to the highest age limit there is a difference in the views, some placing it at 25 years, and one or two going as high as 35 years, only one member setting it as high as 40 years. While the question before us speaks of the qualifications of young men only, yet some of them may have had some experience in railroad service previously, and this experience should be taken into consideration when the higher age limit is fixed. If a man has fired before and given good service, it is the opinion that the age limit could be placed higher than in the case of new men. The general opinion is that from 21 to 25 years is the proper age to start new men. The applicant should make out in his own handwriting in the presence of the officer who is to employ him, an application setting forth his exact age, giving the year and month of his birth, the fact that he is in sound health and not physically disabled in any way, what his educational qualifications are and what schools he has attended, what he has worked at previously and his present occupation. He should give references in writing from some men of character and standing in the community where he has lived, and a school certificate showing how high in the various grades he has been, or a certified copy of the one issued to him giving dates, etc. The applicant's verbal statement should not be taken for this; it should be in writing. At the same time the officer can easily judge from a short conversation on general subjects whether he possesses an active mind and is likely to make a good fireman. At this conversation it is just as well to take up the matter of the temperance question, both as to habits and language. If accepted the applicant should have his sight and hearing tested by the company's surgeon before being set to work. Several of the members state that he should also pass a physical examination at the same time, to make sure that he is not suffering from any disability that will affect him in service. As to the educational qualifications, it is unanimously agreed that a good common school education is absolutely necessary, with a good idea of mathematics. The applicant must be a fair penman, as so many written reports are required of enginemen at the present time. Being a good penman naturally leads to a facility of expression in writing that is needed. Some of the members insist on a high school course as the standard. One member who is well qualified to judge states that college graduates do not give as good service as those with an ordinary education, as they get dissatisfied waiting for promotion and go into some other line of business.

The matter of employing sons of old and trusted employees was taken up, and there is a difference of opinion on it, some alleging that better material is obtained, while others think that new blood is needed right along. The committee thinks that if the same care is taken in selection, that sons of trusted employees should have the preference. As to the employing of men who are already in the service in other capacities which will not unfit them for the work of firemen, like freight brakemen of the proper age and good educational qualifications, it is the opinion that they should have the preference over new men, provided they are recommended by their immediate superior officers. A young man of slouchy appearance will not stand as good a chance of employment as one who is neat and tidy in his dress and appearance. Neatness and order as a qualification of a fireman is very important, and should be looked after closely, if possible, before employment, and certainly in the first few weeks of his service. In some cases the evident leaning of the young man toward mechanical matters is considered a good point. This is true if not carried to an extreme point of the inventive genius who is not content to let the machine alone, but must be making continual changes in it and with various results, chiefly in the line of failures. A mathematical education is of more value than one in the line of languages, as the engineman must be a ready calculator, and the mathematical education makes him a rapid thinker.

This report is signed by C. H. Hogan, R. D. Davis, F. P. Willson, C. B. Conger and T. E. Julian.

Use of the Exhaust Steam from the Air Pump to Heat the Feed Water.

The first question that arises is in regard to the temperature to which the water can be heated in the tender with safety, that is, without impairing the efficiency of the injector. This question alone has

caused several of the members who have answered the circular sent out on this subject, to discourage the idea of heating the feed water with any appliance. They claim that heating the feed water even to a mild temperature, interferes with the working of the injectors; that this trouble always appears when the water is low in the tank. However, some roads are now arranging the air pump exhaust pipe to the tank so that as the water in the tank becomes lower the water is less exposed to the hot pipes thus preventing the water getting too hot when low. Where the steam from the air pump has been turned direct into the tank, considerable difficulty has been experienced on account of the oil from the air pump causing the boiler to foam. Therefore, the Committee would recommend that when the exhaust steam is used to heat the feed water, it should be piped through the tank and the condensation be allowed to escape.

In regard to the economy of using the air pump exhaust, the Committee believes that it has been proven by experiment that a saving of heat and fuel can be accomplished, considering the cost of the pipes, fittings, flexible connections, and maintenance. The first evidence of economy in utilizing the air pump exhaust is the absence of the action of the exhaust on the fire when recharging the train at stations as unnecessary blasts on the fire are expensive on account of the waste at the boiler safety valve. Second, the number of heat units saved by raising the temperature of the water in the tank a certain number of degrees without additional expense other than the cost of apparatus for conducting the steam to the tank. Taking water at 50° Fh. and raising it to 90° Fh. with steam that would otherwise be wasted we have imparted to each gallon of water 333.2 heat-units, or a 4,000-gallon tank, 1,332,800 heat-units. Now supposing that under favorable conditions we can extract 9,000 heat-units from one pound of coal, we have saved 148 pounds of coal to each tank of water used, which would mean to the average locomotive a saving of nine tons of coal per month.

Overheating the water in the tender is the most serious difficulty which attends the heating of the feed water with the air pump exhaust. It should be guarded against by placing the cut-out lever as convenient to the engineman as possible, and he should also be enjoined to use all the exhaust steam possible from the air pump. This, however, is, under the existing conditions, a very difficult matter, as we have been unable to learn of any appliance that would indicate to the engineman the temperature of the water in the tank. Consequently the engineman fearing that he may get the water too hot, will naturally protect himself by not utilizing the air pump exhaust. In regard to the temperature to which the water can be raised without impairing the action of the injector, a number of members have shown a preference to different makes of injectors as to the capability of each instrument for working hot water. As the merits or demerits of the different instruments could not with propriety be discussed in this convention, yet it has been fairly demonstrated by experiment that any of the standard injectors or inspirators will, when working at or about their fullest capacity, work water 20° hotter than when the instrument is throttled at the steam or water for the purpose of reducing the volume. Therefore, when the feed water is heated by any appliance better results can be obtained by using as small sized injector as practicable. This point the Committee believes to be a very good one as there are a great many medium sized locomotives running with Nos. 9 and 10 injectors when a No. 8 would be far more economical with either warm or cold water.

This report is signed by W. E. Widgeon, M. W. Burke, F. B. Farmer, J. C. Currie and G. A. Emerson.

Boiler Compounds and Purges from the Standpoint of the Traveling Engineer.

From the inquiries sent out by the Committee we find that the compound or purge most generally used and having the widest range of adaptability to the various waters is the common soda ash, and the only objection to its use is that if the blow-off cocks are not used and the boilers thoroughly washed that the boilers will give considerable trouble from foaming which is due principally to the sediment thrown down by the compound. Where the compound is used there should be at least two blow-off cocks, one for surface work and one near the mud ring. The boiler should be given a good blowing out both going out and coming in, and when the boiler is washed out it should be done thoroughly, and all mud and scale thrown down by the compound removed. We find that where bad feed water was being used flues and fireboxes gave a great deal of trouble leaking on the road, and since soda-ash has been used it is very seldom that flues and sheets give trouble from leaking. It is a well known fact that if we keep the flues and sheets free from mud and scale that the flues will not leak until the beads are worn off. The waste of heat by blowing off to rid the boiler of the sediment thrown down by the compound is offset by the increased evaporating power of clean flues and firebox sheets and the saving of fuel by having tight flues. One prominent master mechanic expresses his views in the following language in regard to soda ash before and after its use: "There is no question but what the use of soda ash as a boiler purge has greatly increased the life of flues and fireboxes and reduced the cost of repairs over the entire Chicago & Northwestern system. It has, no doubt, been of greater benefit on some divisions than on others according to the quality of water in various localities. In this locality before the use of soda ash was introduced the life of a firebox was about two years, but since the use of the boiler purge was begun and the adoption of reliable blow-off cocks, the life of our fireboxes has been increased about 300 per cent. In addition to this we are having very much less trouble with staybolts and mud-rings leaking since using soda ash and have detected no damaging results to the flues or sheets therefrom. Formerly a set of flues would last from three to six months and now they last from twelve to eighteen months by the generous use of soda ash. The flues are kept much cleaner than before any boiler purge was used and we thus get the benefit of every flue in steam generation until the engines are shopped for general repairs. The number of flues welded in this shop has decreased from 22,376 in 1893, just prior to our commencing to use soda ash to 9,902 in 1898. In connection with this it should be remembered that while we have about the same number of engines in service as in 1893, the mileage per engine has been greatly increased and the results are, therefore, very much in favor of a good boiler purge."

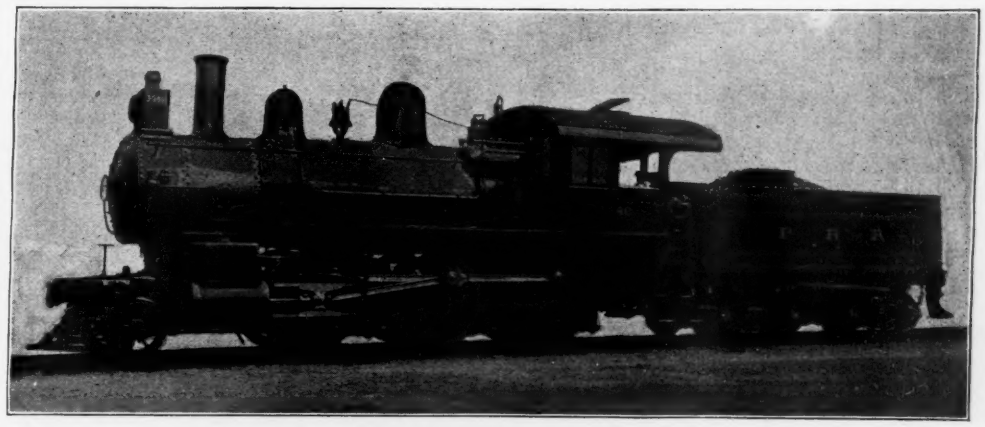
The Committee recommends the use of soda ash as a boiler compound as it has the widest range of adaptability to the various incrusting ingredients contained in the feed water. There are a number of other compounds on the market, some possessing merit, but the cost bars their use on the locomotive. Of course there is some water that will require a special compound, but the chemist should be able to decide that. The chemist should analyze the water and decide the amount of the compound to be used. It was found that in water containing from 2 to 4 lbs. of incrusting matter to the 1,000 gallons that from 6 to 8 oz. of the compound would keep the minerals in suspension, and in water containing more than this amount of incrusting matter to the 1,000 gallons from 8 to 16 oz. of the compound give good results.

Boilers should be furnished with at least two good pneumatic blow-off cocks kept in good working order and boilers should be given a good blowing out both on arriving and departing from terminals. The amount of soda ash for the trip should be put in at the terminal just before the engine is taken out. In using blow-off cocks on the road we would recommend that they be used several times each trip and for a few seconds at a time. This will get rid of a large amount of the sediment thrown down by the purge, and will prevent boilers from foaming, as we find on investigating cases of foaming that the trouble was caused by poor boiler washing and not using the blow-off cocks properly. Boilers should be inspected every time they are washed out to see that the purge is keeping them clean and that the sediment and scale thrown down by the purge has not lodged between the flues and sheets. There should be at least two flues left out in the center of the flue sheet and washout plugs put in so that the space between the flues can be thoroughly washed. We find the average cost of the compound per 1,000 miles is between 25 and 35 cents, and the life of flues have been increased 50 to 75 per cent. We also find where soda ash is being used and boiler washing properly attended to that it is a rare occurrence to have flues leaking on the road, when before soda ash was used leaking flues and sheets was a continual source of trouble.

This report is signed by H. Montgomery, C. McCullum, C. E. Slayton, J. R. Vancleave and G. Wildin.

Pennsylvania Class F 1-A Freight Locomotives.

Four freight engines similar to the one shown in the accompanying engraving, and belonging to the new Class F 1-A have been received by the New York Division of the Pennsylvania Railroad. These engines weigh complete 147,200 lbs., and with the tender 235,500 lbs. They have cylinders 20 in. x 28 in. and the boiler pressure is 185 lbs. These engines are intended for heavy and fast trains and are now hauling loads of 2,700 tons and make good time. The cabs of the engines are very roomy and the locomotives are well liked by the enginemen.



Class F 1-A Freight Locomotive—Pennsylvania Railroad.

The tender truck journals are 5½ in. x 10 in. and the tenders are provided with water scoops. The tractive power per m. e. p. by the usual formula, is 180.6 and the total tractive power with 80 per cent. boiler pressure is 26,729. The engines are said to steam freely and ride well. The following are the leading dimensions and weights:

Cylinders	20 x 28 in.
Steam ports	1½ in. x 18 in.
Exhaust ports	3 in. x 18 in.
Travel of valve	6 in.
Outside lap of valve	1 in.
Fire grate area	30 ft.
Firebox heating area	146 ft.
Total heating area	1,884 ft.
Weight of engine in working order	147,200 lbs.
Weight of tender in working order	88,300 lbs.
Total weight of engine and tender	235,500 lbs.
Boiler pressure	185 lbs. per sq. in.

The engine and tender are equipped with Janney couplers and air signal apparatus, so that they can be used for passenger service when required. Air brakes are on all drivers and the latest 9½ in. Westinghouse air pump is used.

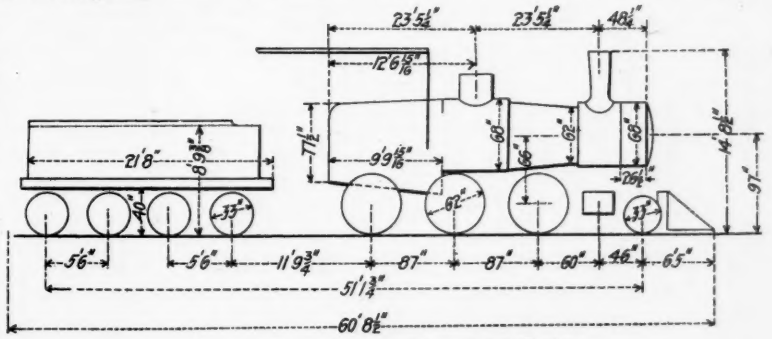
The right side of the engine has a No. 9 Seller's injector and the left side a No. 9 Monitor injector.

The springs on the back pair and main pair of drivers hang from the top of the driving box, but the springs at the front pair of wheels set in a stirrup on top of the driving box.

There is almost perfect freedom from heating when hauling exceptional heavy trains at high speeds.

Fast Run on the Lackawanna.

On Sunday morning, Sept. 17, a special train carrying newspapers was run over the Delaware, Lackawanna & Western from Hoboken, N. J., to Buffalo, 409 miles, in 8 hours 7 minutes. The train left Hoboken at 3.18 a. m. and arrived in Buffalo at 11.25.



Leading Dimensions of Class F 1-A Engine.

The train was delayed 23 minutes at Washington, N. J., by having to set out a car on which there was a hot journal. This and other stops aggregated 44 minutes, so that the time in motion was 7 hours 23 minutes, equal to 55.4 miles an hour. The train had to run behind a regular passenger train for some distance before it reached Buffalo, and the time was therefore longer than it would have been if there had been a clear road. The train consisted

of three cars from Hoboken to Washington, and two cars the rest of the way. Some of the fastest runs without slackening were:

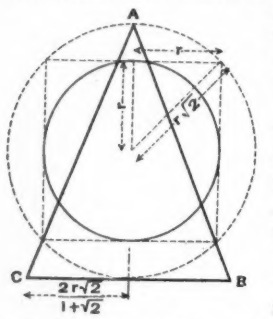
	Miles.	Min.	M.p.h.
Kingsland to Passaic	3.9	3.0	77.3
Port Murray to Washington	3.4	3.0	68.0
Manunka Chunk to Portland	5.5	5.5	60.0
Binghamton to Owego	20.7	20.0	61.8
Owego to Waverly	18.5	17.2	63.4
Bath to Dansville	32.9	30.5	64.8
B., R. & P. Junction to Alden	24.1	20.5	70.5
Alden to East Buffalo	15.4	11.5	80.3

Some Remarkable Geometry.

The Engineer, London, publishes, in its issue of August 18, a method for constructing a triangle having the same area as a circle. Mr. W. J. Thirkettle of Kyneton, Australia, who is responsible for this addition to geometry, sends a sketch which we reproduce after adding some reference letters. We also reprint his explanation and demonstration:

"I have the honor to enclose two photographs of what I believe to be a wonderful discovery in mathematics. Which is supposed to be the simple method the ancient Egyptians had of finding the area of circles and ellipses —which has been lost. The circles and ellipses are both worked out on the same principle. Describe a circle of the proposed size, and then describe a square touching the circle at a tangent; then describe a supernumerary circle, touching the angles of the square; then form a triangle, the apex to be on the centre line of supernumerary circle; then from that point strike one leg of triangle through the lower angle of square, and a leg on the other side the same, then form the base of the pryamid by a line touching the supernumerary circle at a tangent. Wherefore the area of the triangle shall be equal to the area of the circle. It can be easily proved by striking them out on the same piece of drawing paper, and weighing them in a pair of gold scales, and you will find them of equal balance."

This is pretty hard on the "ancient Egyptians," who would have riddled Mr. Thirkettle's geometry in five minutes. By reference to the figures it will be seen that the altitude of the triangle A B C is $2r\sqrt{2}$ and one-half the base is $\frac{2r\sqrt{2}}{1+\sqrt{2}}$; the product of these quantities gives the area of the triangle A B C as $\frac{4r^2}{1+\sqrt{2}}$ or $3.3137\ r^2$. The area of the inner circle is $3.1416\ r^2$, and the difference between these areas is more than 5 per cent. of the area of the circle.



Railway Signaling Club.

A meeting of this Club was held at Chicago, Sept. 12, President A. M. Keppel, Jr., in the chair. The paper which was expected from Mr. Sperry was not received in season to be printed. The principal paper before the meeting was that of Mr. C. C. Rosenberg (L. V.) on the "Overloading of Interlocking Machines." Mr. Rosenberg said:

Signal engineers who have been appointed on roads on which the signal work has been done by some one in connection with other duties have received some legacies which they would thankfully relinquish if they could, viz., machines that are overloaded. Some years ago it was considered good practice to load a lever with about as many switches and bars as could possibly be attached, and occasionally a signal or two was added if it could be done, the object being two-fold: economy and speedy operation. But such a machine would not give the service it should. Connections would wear and it needed constant attention; and its life would be shortened from three to five years. An overloaded machine cannot be handled as quickly as one that has less attachments. It requires the strength of a robust man to reverse a lever; whereas, on a machine fairly loaded, the levers can be operated with greater speed and less time is consumed in setting up a combination.

At the present time, machines are often overloaded when at the beginning there is no intention to do so. Instructions are issued to make a plan for interlocking a certain junction or crossing, the plan is approved and the machine ordered; and after it arrives on the ground, it is found desirable to add a cross-over and possibly a siding. Sooner than go to the expense of enlarging the machine, it is decided to change the locking and add the additional switches and necessary signals to the levers already provided. This is also done frequently because a tower or cabin is only large enough to accommodate the machine in use and, there being no spare levers to attach the extra movement and the cost to enlarge being more than the management care to expend, the outcome is, the machine is overloaded.

The Signal Engineer in making plans should impress his superior officer with the necessity of providing additional spare spaces or levers so as to meet contingencies; the cost is small compared to having the machine enlarged or overloaded.

Discussion.

Mr. Rhea (P. C. C. & St. L.).—I agree with Mr. Rosenberg. In the construction of a machine the additional spare spaces constitute a very small item of the cost. We ought to have a standard as to what to put on the levers of a machine. For instance, you may say you are going to put two full detector bars on one lever and use no switch and lock movement; or that you will put one switch and lock movement on a lever. One switch and lock movement and one bar is about as much load as can be put on one lever. If you attempt to put a cross-over, or a switch and a derail on one lever, you will find that it goes hard. As for selectors, I am fully satisfied that signals can be operated with separate levers cheaper than with selectors, particularly if you are building the machine yourself or can impress upon the signal company the importance of the labor required to put in a selector. When you are setting up a machine it does not matter much whether you are putting in a space or putting in a lever, but when you are putting in a selector you must have the apparatus to hold your selector and all the necessary appurtenances, and the labor in putting in the selector costs a good deal. The difference between the price of the selector and the cost of the levers is so small as to be hardly appreciable.

Mr. Keppel (P. R. R.).—Notwithstanding the additional cost of making the tower and frame large enough to provide for possible additional cross-overs or sidings, I think it is to the credit of the signal engineer to advise that this be done, and I think the Signal Club should go on record as recommending it.

Mr. Rhea.—Signal engineers could accomplish a great deal by carefully looking to the future. We have recently adopted the practice of making our machine frames the entire length of the tower, no matter what is the size of the machine. You cannot figure out any difference in cost.

Mr. Wileman (L. S. & M. S.).—I agree with Mr. Rosenberg in every respect. We have one or two overloaded machines which are very expensive to maintain, while the more lightly loaded ones cost almost nothing for repairs. There is no question at all but that a lightly loaded machine is the most economical. As to the maximum admissible load, I would dispense with switch and lock movements wherever possible. If close to the tower, and well put in, a lever might handle a cross-over and one, or even two, derails, though I would consider that the extreme limit.

Mr. Keppel.—How many levers do you use for a double-slip switch and moveable point frog, with 100-lb. rail?

Mr. Wileman.—A moveable point frog would require two levers and slip switches should have about three, making a total of five levers for operating and locking a double slip switch and movable point frog.

Mr. Morrison (C., M. & St. P.).—We have two sizes of machine frame for towers; one size takes a smaller machine up to a certain number of levers, and then we make a larger frame to take a larger size machine. With a machine smaller than the frame we put in a false floor, and when we wish to enlarge the machine all we have to do is to remove the floor and add the additional levers. We are very careful now not to overload any levers.

Mr. Pflaster.—We have had some hard experience with overloaded machines. We are now using facing point locks in all cases, and are doing away with switch and lock movements.

Mr. Neff (Union Elevated Loop, Chicago).—We have a case, not exactly similar to anything on surface roads, where we spent last year at one time $2,000 to save seven seconds at two different points. I had a case this morning where we had an emergency movement of trains, and found that I was handicapped by the fact that I had two switches loaded on one lever. I think that this club should establish a certain number of pounds pull to a lever. Take your average tower and you know exactly what a man can pull and how quickly he can throw the levers. At our towers, I could show you where two men move twelve levers in three seconds. They are adjusted to a certain number of pounds pull.

Mr. Rhoads (C. C. C. & St. L.).—We have a dynamometer scale by which we are trying to arrive at a standard of resistance levers. We find there is a great difference in the resistance of levers operating apparently under exactly similar conditions. Taking an average tower with derails 400 ft. each way, what would be the minimum resistance of a lever operating one or two derails?

Mr. Wileman.—I should consider 150 lbs. a fair average for the lever with the derails about 400 ft. from the tower.

Mr. Rhea.—It is possible to overload pneumatic switch cylinders. Some movements will require 80 lbs. of air to move them during bad weather. There may be, say, five such movements in one plant, while the other twenty or thirty will move at 60 lbs. pressure, and you have got to supply the extra 20 lbs. simply to work those five movements.

Mr. Ewald (Consulting Engineer for the Illinois RR. and Warehouse Commission).—In regard to overloading, it is the managers we want to get after. They are the ones who want to economize. The signal engineers would generally plan machines so they would not be overloaded.

Mr. Keppel.—The higher officers are watching this club and are making inquiries about certain things which have been brought out in our discussions. The present paper will direct the attention of the railroads to the importance of not overloading machines.

Mr. Wileman.—An overloaded machine which is continually running up a bill of expense for repairs ought to be a good educator.

Mr. Salmon.—There are men in this club who have data of the cost of maintaining a plant that is not overloaded, and similar data of plants that are overloaded, and a comparison of two such plants having the same number of trains, operating under similar conditions, would be useful.

Mr. Rhea.—I have in mind two machines located about a mile apart, operating under similar conditions, except that one is overloaded and the other is not. I can give the cost only from memory, but I can say that the cost of maintaining the one which is overloaded is more than twice what it costs to maintain the other.

Mr. Keppel.—At the last meeting of the club provision was made for the appointment of a committee of five members on inspection of interlocking plants. On that committee were appointed the following members: S. P. Hutchinson, Chairman, P. RR., Lewiston, Pa.; W. J. Gillingham, Jr., Ill. Central, Chicago; Chas. C. Rosenberg, Lehigh Valley, South Bethlehem, Pa.; C. S. Rhoads, C., C., C. & St. L., Indianapolis; and S. E. Denney, C. & N. W. Mr. Hutchinson was burdened with pressure of business after accepting the appointment, and Mr. Rhoads has agreed to act as Chairman.

I would like to see a discussion of switch-lamps.

Mr. Rhea.—On our Panhandle division near Chicago they are using lights in both directions. On the eastern division of the Fort Wayne, which is double track, the switch lights are used only on facing switches. On middle and passing sidings, particularly on middle sidings, we use green and red. On facing switches we use a bull's eye light in the facing direction. The same rule applies to the Cleveland & Pittsburgh, where it was adopted about 18 months ago. Enginemen are practically unanimous in preferring only a facing light and no light on a trailing switch. In shifting, a man is supposed to be there to throw the switch. He throws the switch back and forward and gives the proper signals by hand.

Mr. Keppel.—The next meeting will be held in Boston, November 14; it is the annual meeting, at which the election of officers takes place, and we hope to have three good papers. The large electro-pneumatic plant being installed at Boston Southern Station is worth going to Boston to see. I am told it is the largest interlocking plant in the world.

Wheel Concentrations for Railroad Bridges.

At the Cape May convention of the American Society of Civil Engineers there was a topical discussion on the use of the method of wheel concentrations in determining stresses in railroad bridges. This discussion will be found reported in the August number of the Proceedings of the Society. The remarks which follow are contributed by Mr. W. H. Breithaupt, M. Am. Soc. C. E., as an addition to that discussion.

The question is one that has been agitated for some time. What engineers aim at is to ascertain what is actually taking place in bridges in order to enable correct proportioning. We know, better than we did some years ago, that the effect of the same moving load is proportionately greater in short spans than in long ones; greater in the directly strained members of a structure than in those indirectly strained. Bridges proportioned on the methods of fifteen or twenty years ago can often be made serviceable for higher duty by strengthening or renewing very little besides the floors. In the knowledge to design so that uniform service may be obtained from all the material in a bridge as long as any of it is fit for service, we are, however, as yet far from the absolute. There is here field for the extensometer, more, to my mind, than occasion for change in the method of specifying live loads.

Does a uniform load and one concentration more accurately express the present and probable future conditions applying to railroad bridges?

In 1878 the New York, Lake Erie & Western RR., O. Chanute (Past President Am. Soc. C. E.), Chief

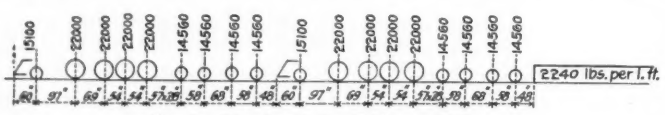


Fig. 1.—Live Loads for Bridges—1878.

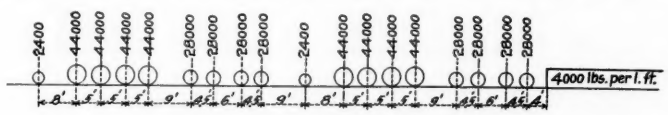


Fig. 2.—Live Loads for Bridges—1899.

Engineer, specified the live load for bridges as given in Fig. 1 on page 654.

Two engines, each with one forward axle, four driver axles and four tender axles, covering together a wheel base of 108 ft. 6 in., followed by a uniform load. The weights were taken from actual Baltimore & Ohio locomotives which served as a type for those of the Erie. As far as I have learned this was the origin of the method of specifying live loads which has now for a long time been in predominant use, and has come to be generally adopted. A present standard live load is given in Fig. 2 on the opposite page.

The placing of the heavier and lighter concentrations in this diagram of 1899 agrees practically with the one of 1878, and the ratio of increase is almost uniform throughout. May not this general arrangement be taken as definitely accepted and likely to continue? If it does not absolutely give the actual live load does it not give it is nearly as it can practically be specified for the class of bridges to which it is applied?

It may be said in passing that axle concentrations of some cars now in use exceed these specified for engine drivers comparatively recently, as for instance Pennsylvania RR. ore cars of 110,000 lbs. capacity and 37,000 lbs. weight, giving axle concentrations of 36,750 lbs.

The proposed alternative is to adopt a uniform live load with a single heavier concentration placed at the head of or anywhere in the train. No one such arrangement will agree in results with a given engine diagram for varying lengths of spans; a table of equivalent concentrations for different span lengths must be used if the engine diagram is adopted as the basis. Having the proper concentration the computing of stresses is simple. On this reason alone there is, however, very insufficient cause for adopting the method. By means of the familiar shear and moment table, comparatively easily obtained for any given engine diagram, stresses are readily calculated. Whichever way it is done, this is generally the smaller part of the work of designing.

It may be taken for granted that purchasers will continue to specify by actual loads, as nearly as these can practically be given, rather than by the deduced method of uniform load and single concentration, which must always be comparatively meaningless to them.

New Scherzer Lift Bridges Over the Chicago River.

Two new rolling lift bridges are now building over the Chicago River at a point which has heretofore been one of the worst obstructed places on that river. This is at the crossing of the tracks of the Chicago Terminal Railroad leading to the Grand Central Station, and at the crossing of Taylor St. The location is shown by the accompanying plat, Fig. 1, which gives in dotted lines the outline of the ends of the protection piers of the former swing bridges, while the position of the new rolling lift bridges are shown in full lines. The improvement made at this point in clearing the channel for the passage of vessels is so evident that no comment is necessary, excepting that the work can scarcely be considered complete until the center pier bridge at Twelfth St. has been replaced.

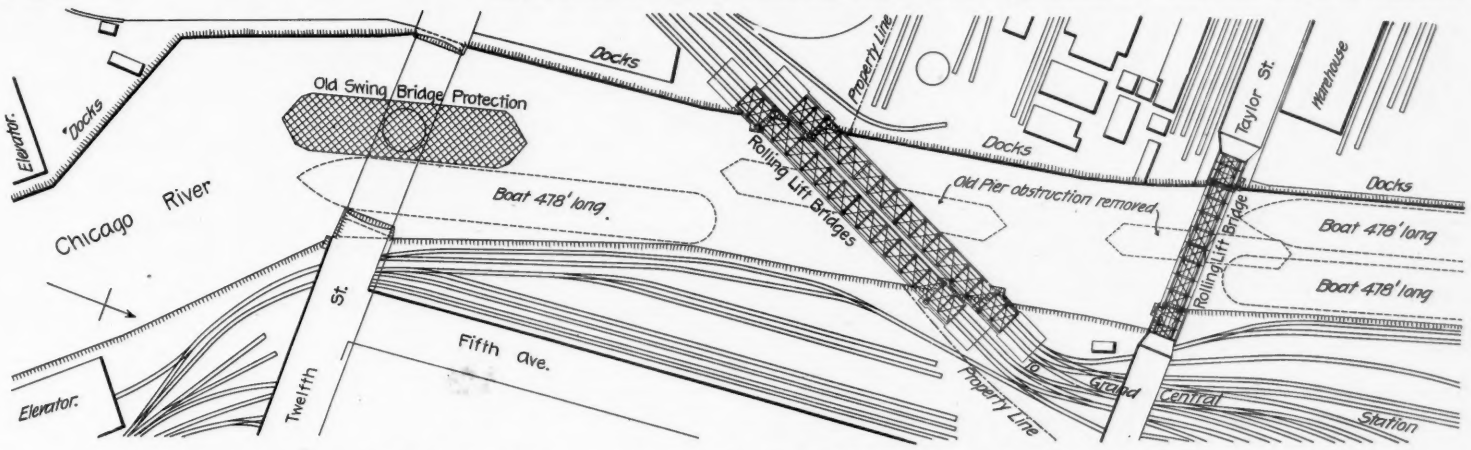


Fig. 1.—Plat Showing Pier Obstructions Removed by New Scherzer Rolling Lift Bridges, Chicago.

These bridges are being rebuilt by the Sanitary District in order that the necessary amount of water for the Drainage Channel may be obtained, the required flow being 300,000 cu. ft. of water per minute. The old bridges formed such an obstruction that it was necessary either to construct an extensive bypass system under some very valuable railroad and warehouse property or build lift bridges. It was estimated that the latter plan would effect a saving of about $95,000. At the Twelfth St. bridge there was thought to be sufficient opening for the present requirements of the Sanitary Disrict.

Fig. 2 shows a general plan of the rolling lift bridge now building at the Chicago Terminal crossing. The design is for two double-track bridges, side by side, to be operated jointly or singly as desired. However, only one of the double-track spans will be built at present; the second bridge will not be built until required. The bridge is designed as a through truss cantilever and crosses the channel at the very acute angle of 36 degrees 30 minutes, which necessitates a span of 275 ft. center to center of end bearings in order to give a clear waterway for navigation of 120 ft., the minimum channel allowed by the Government for the Chicago River Cooper's specifications for railroad bridges, 1896 edition, controlled the design as far as applicable. The loading was taken as 10,000 lbs. per lineal foot of bridge, with a concentrated load of 50,000 lbs. at any point on each track. The bridge will be operated by electric motors, and although provision is made for an operator on each side of the river, yet the machinery and electrical equipment will be so arranged that both leaves may be operated from one side of the channel. The superstructure will be counterbalanced so as to be at rest when opened at an angle of about 40 degrees. This is to assist the machinery in opening and closing the bridge and prevent a possibility of the bridge falling shut by accident and disabling the structure. The substructure for all four tracks is now being put in and consists of Portland cement concrete and Bedford stone which rests upon piles driven to rock and cut off 5 ft. below the bottom of the channel. The superstructure will be furnished by the Pennsylvania Steel Company.

The new Taylor St. highway rolling lift bridge has a span of 148 ft. 7 in., center to center of bearings, the two leaves meeting at the center. The roadway, center to center of trusses, is 20 ft. wide, with a 5-ft. sidewalk on each side. It is designed to carry the heaviest highway and electric street car traffic in accordance with Cooper's specifications for highway bridges. Although this bridge will have the appearance of an arch, it is designed to act as a cantilever, the live load stresses being carried by means of anchorages at the rear of the supporting piers. It will be operated similarly to the railroad bridge just described. A sufficient clearance is allowed for the passage of tugs without opening the bridge. The superstructure of this bridge is being furnished by the Chicago Bridge & Iron Company.

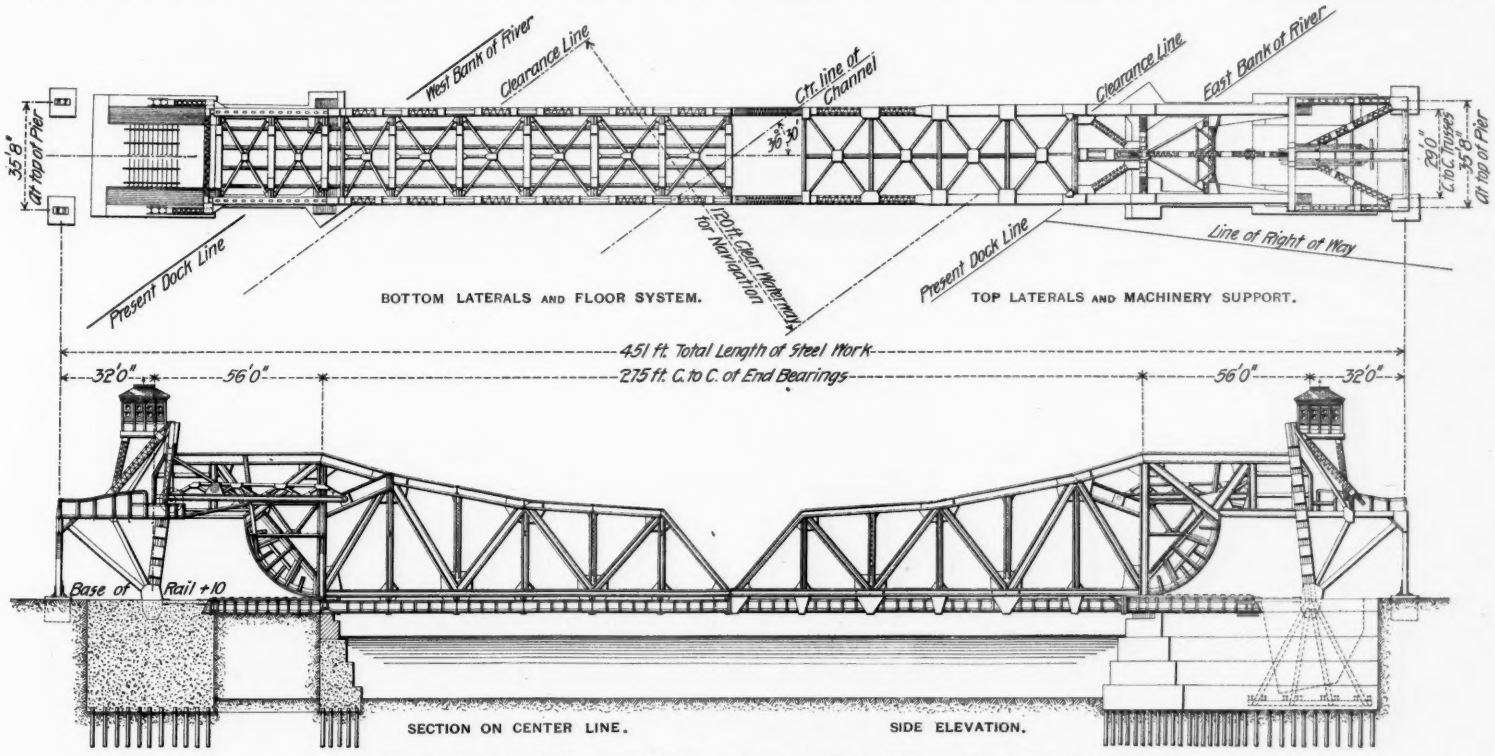


Fig. 2.—Scherzer Rolling Lift Bridge at Crossing of the Chicago Terminal Railroad.

Steel Foundations for Steam Railroad Track.

By Gustav Lindenthal, C. E.

(*Continued from page 641.*)

V.

A comparative estimate of cost of a first class track with wooden ties, as per standards of Penn-

sylvania RR., and of the longitudinal system, is given in the tables herewith.

From these tables it appears that at the present high prices for iron and steel, the sleeper system costs about 50 per cent. more than the wooden cross tie system.

An estimate of the economy of the system resulting from lesser cost of maintenance can naturally not be made with accuracy in advance of a practical trial of the system, lasting at least one year.

As mentioned before, wooden ties are getting dearer and steel will be much cheaper, so that the difference in first cost will actually be much less than 50 per cent. In a year or two it may be only 25 per cent.

It is safe to say, however, that a comparison on the present basis of prices will give a safe estimate of the economies to be expected.

Granting, therefore, 60 years as the probable duration of the steel foundation, we have from the above tables the following comparison of cost per mile:

2,464 cross ties (Penna. RR. standard) including the item for renewal of spikes in Table I:	
Renewed six times (6×1,720.40)	10,322.40
Labor for five renewals (2,464×25c.×5)	3,080.00
Amount in 60 years	$13,402.40
Cost of steel foundation:	
Sleepers complete (see Table 2)	$7,986.70
5% interest for 60 years on the greater cost over wooden ties (7,986.70—1,720.40=6,266.30×300%)	18,798.90
	$26,785.60
Deduct 30% (of $7,986.70) scrap value after 60 years	2,396.00
Amount in 60 years	$24,389.60

The difference, $24,389.60—$13,402.40 = $10,987.20, divided by 60 years, gives the additional cost per year at $183.12 per mile, which must be saved from the annual expense of maintenance and tie renewals to justify the additional investment in better track.

On railroads with dense traffic, on which that expense reaches now $700 to $1,000 per year, it is very probable that for the reasons, above mentioned, the saving with the longitudinal system will readily reach $500 to $700, so that the amount remaining for the stockholders after deducting $183.12 will be from $300 to $500 per mile. A railroad showing increased net earnings of that amount per mile from freight and passenger traffic is accounted as doing very well.

But actually the saving can be larger; first, because solvent railroads can raise money for improvements nowadays at 3½% instead of 5%, and next, to repeat it, because iron and steel prices will certainly be less in a few years than what they are now, so that the first cost per mile of such track will be under $12,000 instead of $14,368.19, and distributed over 60 years it will cost no more, if indeed not less, than the track with wooden ties.

Along with these economies will be a very much better, safer and smoother track, the like of which will only be found on some of the very expensive road beds for the electric street cars in New York. The reduction of wear and tear in rolling stock will be another important saving, although it also cannot be estimated accurately in advance. It would seem, however, that $100 per mile on that account is admittedly moderate.

Altogether the economies to be expected from modern track can be taken as at least $500 per mile, equal to 5% on $10,000, while the additional investment in the track need not under any circumstances exceed ($14,368.19—$9,501.74) $5,000 per mile.

The same weight of steel, about 88 lbs. per lineal foot of track used in the form of cross ties, would likewise cost per mile about $5,000 more than for wooden ties, but as mentioned before, it is not productive of any saving in the expense of maintenance. It would mean the investment of additional capital without profit.

Invested in the longitudinal sleeper system, the capital will earn more than 10 per cent. and furnish a road bed superior to any in existence.

If the same rigidity of track were obtainable on wooden ties through a heavier rail, which is very doubtful, then, as said before, it would have to weigh at least 170 lbs. per yard and the additional cost for rails and heavier splices and bolts, etc., at the same prices, would amount to about $4,000 per mile, which is only $1,000 less than for the steel sleeper track, but there would not be the saving of a dollar in the cost of the cross ties nor any saving worth mentioning in all other items of maintenance.

So, in whatever way the various track constructions are compared, the most economical in the end will be the steel sleeper system.

VI.

There is probably no other detail of railroad track on which so much inventive skill, theory and money have been spent and wasted as on the rail joint, and yet almost without exception it is as noisy and as troublesome to keep up as ever.

The first requisite and supreme test of a good rail joint is smoothness and noiselessness. How many, if any, meet this condition?

The value of a rail joint is in the inverse ratio of its noise; value refers to safety, smoothness and durability. Noise is an announcement that the rail is wearing off faster at the ends than elsewhere, and that it will not last as long as it should; it is notice of harm being done to the rolling stock and of money being wasted.

Strength alone gives no value to a rail splice. Some of the strongest joints are the noisiest and therefore the worst. It is a misconception that the rail is weaker at the ends than elsewhere, and that splices must have equal strength with the rail. Is a beam or a cantilever weaker at the end than at other points?

The experiment has been tried in Germany of cutting out the railhead about ⅜ in. wide and ½ in. deep in a solid rail to represent the opening at a rail joint.

The cut cannot be detected by ear, the wheels passing over it noiselessly. Neither do the edges of the cut show any greater wear than the railhead elsewhere. The rail is certainly much weakened at the cut, yet it does not announce its weakness by the pounding noise always present even in the strongest rail splices.

That experiment points the way to the only proper form of rail joint, and to the principal condition which it must fulfill; and this is, that the rail ends must be kept absolutely immovable at the same level. To accomplish this under a possible shearing force of 50,000 lbs. per driving wheel and to provide for expansion at the same time, in any other way than by anchoring the rail ends very hard down to a firm base support, must be regarded as a mechanical impossibility. Vertical strength equal to that of the rail is not a requisite of a good rail joint. Splice bars, intended to be tightened with bolts through the rail web and which support the rails by the ears as it were (namely, under the rail head), will give a noiseless joint for a few days only, until the scale—$\frac{1}{100}$ to $\frac{1}{20}$ in. thick—gets worn off at the contact surfaces, and then the music begins; first, pianissimo, gradually increasing to an incurable fortissimo. Other forms of joints and splice bars, which bend under and pretend to support the rail ends at the base, but nevertheless also rely upon horizontal bolts for tightening and for adjustment, likewise very soon announce to the world the impossible, with most irritating persistency.

And so with certain joints, in which the outside splice bar is made extra heavy and level with the rail top, the wheels rolling over the splice bar without depressing the rail ends. They are similarly faulty, in that besides being hard to keep tight and noisy too, they wear off with the rails and must be renewed with them.

To this form of joint, recently much favored in Germany, there is the further objection that the outside splice bar is struck by worn wheels, of which there are always a large number in every train. The bar is then the cause of the blow at the joint instead of the deflecting rail ends. One cause of blow is as bad as another.

In the longitudinal system, as proposed, there is no difficulty in providing a thoroughly efficient, durable and noiseless rail joint, which will practically last forever. Rails must be renewed, but this joint need not be. It is shown in Figs. 5, 6 and 7.

The rail ends are held down to a base support, made of cast steel, and which itself is bolted down

MATERIAL REQUIRED AND COST PER MILE OF SINGLE TRACK RAILROAD SUPERSTRUCTURE WITH NO. 1 90 LB. STEEL RAILS.

TABLE I.—SPIKED TRACK WITH WOODEN CROSSTIES.

Items.	Dimensions.	Number of Pieces per Mile.	Weight of Each Piece in Lbs.	Weight per Mile. Gross Tons.	Weight per Mile. Net Tons.	Prices. Gross Ton.	Prices. Pound.	Cost of Single Track, Mile.	
Steel rails (90 lbs.) delivered on ground	60′ long.	176	1,800.00	141 43	.....	$28.00	.....	$3,960 04	
Steel splice-bars (6 holes)	24″ long.	352	39.00	6 13	.....	.....	1.75c.	240.24	
Splice bolts (6 to each joint)	5¾″ long.	1,056	1.70	0 82	.....	.....	2 25c.	40 39	
Nut locks (6 to each joint	.....	1,056	.....	.....	.....	.....	1.2c. each.	12.67	Foundation to be renewed $1,720.40 per mile.
Cross ties (28 to 60 ft.)	.....	2,464	185.00	.....	.....	.....	65.0c. each	1,601.60	
Spikes	6″ long.	11,000	0.60	.....	3.30	.....	1 8c.	118.80	
Broken stone ballast	8″ under ties.	2,400 c. y.	.....	.....	.....	.....	$1 25 @ c. y.	3,000 00	
Labor, laying track material	.....	.....	.....	.....	.....	.....	.....	528.40	
Total	.....	.....	.....	.....	.....	.....	.....	$9,501.74—$1.80 per lin. ft.	

Effective bearing area on ballast for a rail length of 60 ft..... .....28 ties @ 5 sq. ft. = 140 sq. ft.

TABLE II.—LONGITUDINAL STEEL SLEEPER SYSTEM.

Items.	Dimensions.	Number of Pieces per Mile.	Weight of Each Piece in Lbs.	Weight per Mile. Gross Tons.	Weight per Mile. Net Tons.	Prices. Gross Ton.	Prices. Pound.	Cost of Single Track, Mile.	
Steel rails (90 lbs.) delivered on ground	60′ long.	176	1,800.00	141.43	.....	$28 00	.....	$3,960.04	
Steel splice-bars (4 holes)	24″ long	352	20.00	3.09	.....	.....	1 75c	123 20	
Splice bolts (4 to each joint)	5¾″ long	704	1.70	0.55	.....	.....	2.25c.	26 93	
Nut locks (4 to each joint)	.....	704	.....	.....	.....	.....	1.20c.	8.45	
Castings for rail joints	4″ × ⅝″ × {24″ / 12½″}	176	56.00	.....	4.93	.....	4.00c.	394.24	
Hook bolts for castings	⅞″ diam.	352	1.30	.....	0.23	.....	2.25c.	10 30	
Clips for castings	5″ wide.	352	7.80	.....	1.37	.....	2.00c.	54.91	
Bolts for casting-clips	1¾″ diam.	352	4 30	.....	0.76	.....	2.25c.	34.06	
Bulb angles, 50 lbs. per yd., includ'g work of rivetting.	8″ × 6″ × 7/16″ × 30′ long.	704	500.00	.....	176 00	.....	1.60c.	5,632.00	Substitute for crossties, $7,986.70 per mile.
Z crossties 24″ C. to C., including work of rivetting	4″ × 7/16″ × {18″ long. / 10″ long.}	10 208	8.82	.....	45.02	.....	1.60c.	1,440.55	
Rivets for Z ties	⅝″ diam.	38,016	0.27	.....	5 13	.....	2.00c.	205 29	
Bolts and nuts for Z ties, at joints	⅝″ diam.	2,816	0 40	.....	0.56	.....	2 25c	25.20	
Clips for rails on Z ties	2¼″ × 2½″ × 13/16″.	10,208	0.85	.....	4.34	.....	2.0 c	173.54	
Bolts and nuts for rail clips	⅞″ diam.	10,208	1 50	.....	7.66	.....	2 25c.	344 52	
Splice plates for sleepers	17 11/16″ × 6¼″ × ⅜″.	704	9.60	.....	3.38	.....	2 00c.	135 20	
Rivets for sleeper-splice plates	⅝″ diam.	5,632	0 27	.....	0.76	.....	2.60c.	30.40	
Gaugebars	2″ × 2″ × ⅜″ × 5′ 10″ long.	760	27.40	.....	10.41	....	1 90c.	395.58	
Clips for gaugebars	2″ × 2 1/16″ × ⅝″.	3,040	0.73	.....	1.11	.....	2 00c.	44.40	
Bolts and nuts for gaugebar clips	⅝″ diam.	1,520	0 46	.....	0.35	.....	2.25c	15.75	
Rivets for gaugebar clips	⅝″ diam.	1,520	0.32	.....	0.25	.....	2.00c.	10.00	
Crude oil, to sprinkle ballast surface	.....	.....	.....	.....	.....	.....	.....	15.00	
Broken stone ballast	8″ thick for sleepers.	608.5 c. y.	.....	.....	.....	.....	$1.25 @ c. y.	760 63	
Labor, laying track material	.....	.....	.....	.....	.....	.....	.....	528.00	
Total	.....	.....	.....	.....	.....	.....	.....	$14,368.19	$2.72 per lin. ft.

Effective bearing area on ballast for a rail length of 60 ft..... = 200 sq. ft.

to the sleeper with clip bolts, engaging the edges of the bulb angles. The slots in the casting permit of lateral adjustment. The rail ends are first spliced with ordinary splice bars and fish bolts, which keep them in proper alignment. The anchorage of the rail ends is through two vertical bolts, each 1¾ in. diam. with washers engaging the base of the rail ends. The tension on each bolt is equal to about 25,000 lbs.

The rail ends are through the casting rigidly supported on the sleepers, and can play neither up nor down. The casting, as may be seen, can be adjusted under the rail ends, wherever they happen to come on the sleeper.

It will be noticed that no reliance for vertical strength of the joint is placed upon the two four-bolt splice bars.

They do not fit snugly between rail-head and rail-base, as is the usual practice for all rail-splices.

And they are not intended to resist any part of the shearing force from wheel loads.

Ample provision for transmitting that shearing force from one rail-end to the other must be the controlling element of any efficient rail-splice.

All the endless forms of splice-bars in use have that one feature in common, that they rely for that purpose upon a tight fit between rail-head and rail-base. But it is impossible with that construction to avoid wear of the contact surfaces, particularly on the upper edge of the splice-bar under the rail-head. When the splice-bars are new, the shear from the wheel-loads must pass at first through the sharp edges of the rail-end under the head to the splice-bars, where theoretically the bearing is on a line or knife-edge, and not upon an area. As a result the metal is crushed on top of the splice-bars, gradually progressing each way from the joint, until the edge is hollowed out from $\frac{1}{16}$ to ⅛ inch deep and from 4 to 6 inches each way from the middle.

On double track roads, with the trains always in the same direction on each track, that wear is several times greater under the receiving rail-end than under the delivering one. This is so, because the wheel-load is static in its effect on the delivering rail-end, and dynamic on the receiving one, which gets the load suddenly and in the form of a blow.

The wear is inavoidable, and it is also irregular, and therefore cannot be taken up by tightening of the splice-bolts. Whether the splice-bars be made long or short, with six, four or only two splice-bolts, makes no difference in their unfitness for transmitting the shearing force.

There are other splice-bars, some of grotesque form, purporting to support the rail-ends under the base, because they bend or reach under and are wedged against it with horizontal bolts. Other splice-bars have a similar feature combined with ordinary bearing under the rail-head.

Of any and all of them, a careful analysis can predict, and could have predicted, the fact, found in actual trial, that the contact surfaces are subject to abrasion and why they are so. They are all noisy after a while, because again of their unfitness for transmitting the shearing force from wheel-loads.

All tight-fitting splice-bars failing in that prime requisite, it is not worth while to discuss the bending strains in them or the incongruity of their deflection curve with that of the rail ends. It could, however, be shown, that by reason of the very rapid repetition of sudden strains, alternating between tension and compression, rail splice-bars are the most over-strained and worst abused pieces of patient metal to be found in any construction.

The junk heaps in all railroad yards contain many specimens bearing witness to that fact.

Nor would it be profitable to discuss a permanent remedy, if there were one, for the always loose and low joint ties, which are inseparable from faulty and noisy rail-joints.

In my construction there is no shearing stress at all, as each rail-end is supported on a bearing area of 12½ square inches, which for a load of 50,000 lbs. per driving wheel would reach only 4,000 lbs. per square inch.

Moreover, this bearing will not be subject to dynamic effects and abrasion, because each rail-end is held down with a force of 25,000 lbs. through the two vertical bolts. The wheel-pressure must first relieve the initial tension on these bolts, before it can increase the pressure on the rail-base. It is on the same principle, according to which an artificial initial tension is produced in the hoops of a cannon, to safely meet the dynamic strains from the explosion of the powder charge.

The great tension on all the vertical bolts (joint and track bolts) will not prevent heavy rails from expanding; but if lighter rails are used, and should not expand, no harm will be done. The rails cannot warp, either vertically or laterally, as they are apt to do with the cross tie system. The rails, firmly held in position on the longitudinal sleepers, would simply absorb the expanding force in the form of elastic compression amounting to at most 12,000 lbs. per square inch, which, in combination with the bending strains, do not yet reach the elastic limit (40 to 50,000 lbs.) of the usual rail steel. The rails can safely be laid with close joints for a temperature of the air of 60° F. It is of greater importance to provide for a durable, smooth and noiseless rail joint, anchored firmly down, than for temperature strains, which of themselves are harmless with this system of track foundation.

It will again be observed that the bearings of all screw nuts are on ridges, preventing one-sided strains on the bolts.

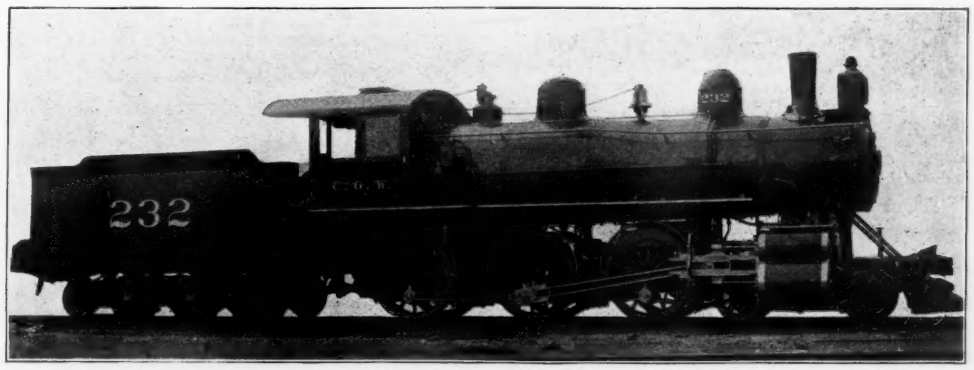
[TO BE CONTINUED.]

Heavy Freight Locomotives of the Chicago Great Western Railway.

The accompanying engraving shows one of the 10 heavy 10-wheel freight locomotives built by the Baldwin Locomotive Works for the Chicago Great Western. Five of these differ from the one shown in that they have 20x28 in. cylinders, single expansion, instead of compound. Mr. D. Van Alstine, the Master Mechanic, says that all of these are giving excellent results, but that the compounds are making better fuel records than the simple engines, but none of them have been in service long enough to tell how much saving will be effected by the compounds.

The compound locomotive shown has cylinders 15½ and 26 in. by 28 in., 63-in. driving wheels with cast steel centers and flanged tires on all wheels. The weight in working order is 160,000 lbs., of which 120,000 lbs. is on the drivers. The driving wheel-base is 15 ft. and the total wheel-base 27 ft. 2 in. The driving boxes are cast steel and the journals are 9x12 in., the main crank pin journal being 6¾x6 in., and the engine truck journals 6x12 in. The engine truck has a swing bolster and 30-in. wheels.

The boiler is of the wagon top type, 64 in. in diameter at the first ring, and is designed to carry a working steam pressure of 200 lbs. There are 275 tubes, 2¼ in. in diameter and 15 ft. long, giving a tube-heating surface of 2,410 sq. ft. The firebox, which is 9 ft. 4 in. long and 3 ft. 6 in. wide, has a heating surface of 190 sq. ft., making a total heating surface of 2,600 sq. ft.; the grate area is 32.6 sq. ft. A brick arch is used, supported on 3-in. water tubes.



Baldwin Compound Freight Locomotive for the Chicago Great Western Railway.

The tender has a capacity for 6,000 gallons of water and 10 tons of coal, the underframe being made of 10-in. steel channels. The tender wheels are cast iron, 33 in. in diameter, and spaced to make a wheel-base of 15 ft. 4 in.; the journals are 4½x8 in. and "Standard" trucks are used.

The special equipment includes American-Westinghouse air brakes, steel driving axles treated by the Coffin process, Tower couplers, Hancock injectors, Nathan lubricators, Crosby whistles, Ashton safety valves, Leach pneumatic sanding device, Jerome metallic packing for piston and valve rods, McIntosh blow-off cocks and Kewanee brake beams.

Westinghouse Brakes in Russia.

Consul-General Holloway, of St. Petersburg, under date of July 27, 1899, writes:

"In transmitting the translation of the ministerial order requiring all standard Russian railroads to equip their freight cars and engines with the Westinghouse air brakes by January 1, 1903, at a cost of several million roubles (this order provides that the introduction of other systems of continuous automatic brakes will only be allowed after a trial of three years), I desire to state that the Westinghouse Company has erected a fine plant here, equipped with the latest improved American machinery, and is now employing a large force under experienced American engineers. The general manager is Mr. A. Kapteyn, of London, who is assisted by Mr. Walter Phillips, of Philadelphia, and by American experts in charge of the various departments.

"This order involves the equipment of 300,000 cars, as well as a large number of locomotives, 60,000 of which are to be fitted with Westinghouse air brakes and 240,000 with air pipes and couplings inside of three years. This will place all the cars under control of the air brake, an improvement over the American system of making up trains of freight cars with and without air brakes, making it impossible to control the cars without the same.

"Russia is the first country in Europe to use the continuous air brake for its freight and military trains.

"While Russia began the development of its industrial resources much later than other nations, she is pursuing the policy of equipping her new factories with the latest modern machinery and adopting the most perfect methods of manufacture, as shown in the many new industrial plants in course of construction, which are almost without exception among the finest to be found in Europe. These are being assisted by the enterprise of Americans, who are beginning to appreciate and take advantage of the opportunities offered by this country.

"The most important articles of the order are given below:"

Ministry of Ways and Communication, June 19, 1899.

Article 1. In virtue of the opinion of the State Council, recorded on the 30th of March, 1898, imperially sanctioned, continuous automatic brakes are to be applied to the engines and trucks of the freight stock circulating in direct traffic on the Russian system of normal 5-foot gage railroads.

Art. 2. In conformity with the decision of the Ministry of the Ways of Communication and of the extraordinary congress of representatives of the service of rolling stock and traction, summoned in January of this year (1899), on the question of the choice of the fundamental system of continuous automatic brakes for freight trains, the Westinghouse system of brakes is adopted.

Art. 3. The introduction of other systems of continuous automatic brakes is allowed upon condition: (a) Of the previous trial of the new system on trains of local circulation, during not less than three years, for its thorough trial under the ordinary conditions of working; (b) of the possibility of the combined action of the new system with Westinghouse's system; (c) of the mutual interchangeability of the connections (couplings); (d) previous to the introduction of the new system into direct communication, the question of its practical suitability for this object is to be considered by the congress of representatives of the service of rolling stock and traction, and the ratification of the conclusion of this congress is to follow the usual course.

Art. 4. The equipment of the freight stock with continuous brakes is to be carried out in the following sequence:

(a) In the course of the first four years, brake apparatus will be placed on all freight engines and tenders.

(b) In the course of the same period of time, main pipes will be placed on all freight trucks in direct traffic.

(c) In the course of the same four years, the wagons which have to be provided with continuous brakes will be equipped with foundation brakes, and the equipment of these wagons will be made complete, maintaining the hand brake, but the brake apparatus of the wagons must be taken down and kept in stock until the time when it will be fixed permanently to the stock.

(d) With a view to carrying into effect points a, b and c, there will be ordered in the course of the first four years the necessary number of engine and carriage fittings, connecting tubes, and brake gear.

Art. 5. During the second period of time—i. e., after the expiration of the first four years—all the brake trucks in direct traffic will be supplied with brake apparatus and guards' taps and all the carriages of direct communication (both braked and non-braked) with rubber hose couplings, two to each carriage. The rubber hose couplings must be got ready in due time.

Art. 6. In the course of the second period of time, premises will be constructed for the storage of spare parts necessary for the maintenance and repair of the brake fittings, and the necessary number of spare parts provided.

Art. 7. On freight engines, first of all, the tenders will be equipped with brake apparatus.

Art. 8. Brake blocks will be applied to the driving wheels of the normal freight engines after the necessary alterations in the construction of these engines have been made. The fitting of brake blocks to the driving wheels of freight engines of other types is left to the discretion of the local managements of the lines, depending on the construction of the engines.

Art. 9. The work indicated in Article 8 will be proceeded with not earlier than after the complete termination of the work indicated for the second period.

Art. 10. The periods of time for the work indicated are: First period, from the 1st of January, 1899, to the 1st of January, 1903; second period, from the 1st of January, 1903, to the 1st of January, 1905; third period, from the 1st of January, 1905, to a date not predetermined.

Art. 11. When fixing the main brake pipe to the carriages, before the complete equipment of the brakes can be finished and until a decision has been taken as to the most rational means of preserving the connecting tubes from choking and rusting, these tubes will be stopped with solid wooden stoppers, and these stoppers cut flush with the edges of the tubes, so that they cannot be taken out.

Remark.—It is allowed to bring forward, for the consideration of the next consultative congress of the representatives of the service of rolling stock and traction the question of the application of some other more expedient means of preserving the connecting tubes from choking, until the time that the brakes are brought into use.

Art. 12. For the brake blocks of the engines, tenders and carriages, the type of blocks of the normal goods truck will be adopted.

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Art. 14. After communicating with the managements of the various lines, the number of braked vehicles of the non-normal type which it will be expedient to equip with air-brake apparatus will be indicated; and in conformity with these in-

dications and the number of normal brake carriages available on State and private lines, the building of new standard vehicles with brake will be arranged for, and the necessary credit asked for the State railroads and the necessary means founds for the private railroads so calculated that by the 1st of January, 1903, there shall be on the various lines the whole number of braked vehicles required, as prescribed in Article 24 of the present order.

Art. 15. For acquainting the staff of servants with the construction of the brake appliances of the Westinghouse system, and for the instruction of that staff in the operation and regular use of the brake, there will be used training or instruction carriages provided with drawings, models and installations containing all the parts of the brake system and capable of being brought into action in the same manner as is done on the train.

Negotiations will be entered into with the Westinghouse Company for the preparation, for the State railroads of one such carriage, in order that, in the course of the first period, a tour may be made over the State lines in the said carriage by skilled persons from the said firm, for imparting to the staff of servants the necessary instructions.

* * * * * * * * *

Art. 19. Of the various systems of brakes tried by the brake commission, one superior system (not reckoning the Westinghouse system), admitting of harmonious action with the Westinghouse system, is to be introduced on the passenger trains of one of the railroads indicated by the direction of the Ministry of the Ways of Communication, with the proviso that the brake system selected is to be subjected on the said line to trial and thorough test under the ordinary conditions of working, during a period of three years, after which the question of the expediency of adopting this system for the goods carriage stock will be considered.

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Art. 24. The number of freight cars in direct traffic to be equipped with complete brake apparatus must be in accordance with the rules now in force for hand brakes (20 per cent.).

Art. 25. The equipping of the freight stock of the Transcaucasion Railroad with continuous automatic brakes is to be carried out independently of the present rules, viz., the engines, tenders and vehicles of this road to be provided simultaneously with complete Westinghouse brake apparatus, pressure-retaining valves, brake-gear connecting tubes, intercarriage hose couplings, and guards' taps.

* * * * * * * * *

Art. 29. Private railroads are allowed to order brake apparatus of the Westinghouse system, according to their discretion, in whole sets or in separate parts and to give these orders either through the management of the State railroads or by independent contract, as may be found of most advantage to them.

The drafts of independent contracts concluded by the managements of private railroads for the supply of the abovementioned brake apparatus must be presented for approval to the Ministry of Ways of Communication, with a detailed explanation of the reasons on account of which the management of the road prefers ordering by independent contract and not through the intermediary of the State railroads department.

At the same time, the managements are forewarned that they can reckon on the approval of the ministry of the said draft contracts, only in case there should be incontestable advantages in doing so as compared with ordering the same articles through the intermediary of the State railroads department.

Train Accidents in the United States in July.

COLLISIONS.

Rear.

3d, on Philadelphia & Reading, at Quakake, Pa., a freight train ran into the rear of a preceding freight, wrecking the engine, caboose and several cars, some of which fell down a bank. A woman gathering coal at the side of the track was killed.

4th, on Southern Pacific, at Port Costa, Cal., a passenger train ran into the rear of a preceding passenger train; two passengers injured.

8th, on Baltimore & Ohio, at Rowlesburg, Md., westbound passenger train No. 1 ran into an engine standing on the main track, damaging both engines and the postal car. Both enginemen and one fireman were injured.

10th, 4 a. m. on Southern Pacific, at Newman, Cal., an excursion passenger train ran into the rear of a preceding freight train and the engine and the first car, a sleeping car, were badly damaged. The tender penetrated the sleeping car and two passengers in the forward end were killed. Eleven other passengers were injured, all of the 13 being women.

16th, 10 p. m. on Missouri, Kansas & Texas, at Wybark, I. T., a freight train ran over a misplaced switch and into a freight car standing on the side track, and the engine was ditched. The engineman was killed.

17th, on Metropolitan Elevated, at 19th street, Chicago, a passenger train ran into the rear of a preceding work train; three passengers injured.

17th, on Long Island road, near Flatbush avenue, Brooklyn, N. Y., a passenger train ran into two platform cars which had been left standing on the main track without a protecting signal, and the engine was derailed. Three trainmen were injured.

24th, on Chicago, Milwaukee & St. Paul, at La Crosse, Wis., a passenger train ran over a misplaced switch and into some freight cars standing on a side track. One passenger was injured.

25th, on Pennsylvania road, at Nescopeck, Pa., a freight train ran over a misplaced switch and into a car occupied by passengers standing on a side track. Several passengers were injured, two of them seriously.

26th, on Santa Fe Pacific, at Angell, Ariz., a freight train ran into the rear of a preceding freight, wrecking the caboose. The engineman was killed and the fireman was injured.

28th, on Lehigh Valley, near Kohinoor Junction, Pa., a coal train descending a grade broke in two and the rear portion afterward ran into the forward one. A brakeman was injured. The engineman was obliged to stop the forward portion of the train in consequence of the presence of another train on the track ahead of him, and, although there was another engine at the rear of the broken train, the runner of it was unable to control that part of the train.

28th, on Northern Central, near Shamokin, Pa., a train of 50 cars of coal, drawn by two engines and pushed by two others, broke apart in two places, near the middle. The second portion consisting of 15 cars ran back into the third, and 10 cars were wrecked.

31st, on Santa Fe Pacific, at Dennison, Ariz., an empty engine ran into the rear of a preceding freight train; a brakeman was killed and two other trainmen were injured, one of them fatally.

And 29 others on 20 roads, involving 2 passenger and 36 freight and other trains.

Butting.

2nd, on St. Louis, Iron Mountain & Southern, near Mill Springs, Mo., butting collision of freight trains, wrecking both engines.

11th, on Chicago & Grand Trunk, at Penfield, Mich., butting collision of westbound passenger train No. 3 and eastbound passenger train No. 10. Five passengers and four trainmen were injured, all of the injured passengers being on the westbound train.

17th, on New York, New Haven & Hartford, at New Haven, Conn., a passenger train ran over a misplaced switch, through a crossover, and into the head of another passenger train moving in the opposite direction, and both engines and both baggage cars were badly damaged. An express messenger was injured.

18th, on Norfolk & Western, at Haverhill, O., butting collision between passenger train No. 3 and a freight, wrecking both engines, 20 freight cars and two baggage cars. One engineman, one fireman and one brakemen were killed and two trainmen and a tramp were injured. There was a dense fog at the time, so that the men on the engines had no time to jump off. It is said that the freight train should have waited at the last preceding station, but that the crew mistook a passing freight train for the passenger and started out on the assumption that the passenger had passed and the road was clear. A brakeman says that the crew had all been sleeping, and it appears that this brakeman was the only one of the men who awoke in time to hear the freight pass.

21st, on Cleveland, Cincinnati, Chicago & St. Louis, at Indianapolis, Ind., butting collision of switching engines; one fireman injured.

24th, on Norfolk & Western, near Pulaski, Va., butting collision of freight trains, badly damaging both engines and several cars; two trainmen injured, one fatally. The collision is said to have been due to a mistake in telegraphic orders.

24th, on Central of Georgia, near Covington, Ga., butting collision between a passenger train and a work train, both engines being thrown down a bank. One engineman and one fireman were injured.

23d, on Western New York & Pennsylvania, at Oil City, Pa., butting collision between a passenger train and a switching freight, badly damaging both engines. Five passengers were injured. It is said that the collision was due to a misunderstanding of signals.

25th, on Philadelphia, Wilmington & Baltimore, near Blackbird, Del., butting collision of freight trains, one of which was running at high speed; three trainmen injured. There was a dense fog at the time.

29th, on Union Pacific, near Wolcott, Wyo., butting collision between eastbound passenger train No. 4 and an empty engine, wrecking both engines. The engineman and the fireman of the passenger train were killed and two mail clerks were injured. It is said that the engineman of the westbound engine entered on the main track on the time of the passenger train, without leave.

30th, on Southern Pacific, at Clement Junction, Cal., butting collision between a passenger train and a pay train, badly damaging the engines and three cars. Two trainmen were injured.

And 11 others on 11 roads, involving 7 passenger and 15 freight and other trains.

Crossing and Miscellaneous.

4th, on Chicago, Burlington & Quincy, at Savanna, Ill., collision between a freight train and a switching engine; the fireman and one other person were injured.

6th, on New York Central & Hudson River, near Ogdensburg, N. Y., a freight train ran over a misplaced switch and into a switching engine standing on a side track, badly damaging both engines and several cars; three trainmen injured.

8th, on Colorado Midland, at Divide, Colo., collision between the two parts of a freight train which had an engine at each end, damaging one engine and several cars. One fireman was injured. The engine at the rear of the train had pulled back a part of the cars and was pushing them into a side track when the runner of the forward engine mistook a hand signal and backed his part of the train.

18th, on Atlantic Coast Line, near Plymouth, N. C., collision between a passenger train and a freight at a crossing, overturning both engines. One engineman, a porter and a mail agent were injured, the two first named fatally.

23d, on Western New York & Pennsylvania, at Buffalo, N. Y., a freight train collided with a car standing on a side track and fouling the main line. A brakeman jumped off and was injured.

27th, on Pittsburgh & Lake Erie, at Beck's Run, Pa., a passenger train ran into the side of a freight train which was crossing the main track, and the engine and five freight cars were wrecked. The engineman and fireman were injured.

28th, on Cleveland & Pittsburgh, near Mingo, O., collision between a work train and a switching engine; seven employees injured.

28th, on Chicago, Burlington & Quincy, near Murray, Ia., three cars broke away from the rear of a freight train standing on a side track and ran out on the main line, where they were struck by a passenger train. The engineman jumped off and was injured.

29th, at Cambridge City, Ind., a freight train of the Pittsburgh, Cincinnati, Chicago & St. Louis collided with a freight of the Cleveland, Cincinnati, Chicago & St. Louis at the crossing of the two roads. One trainman was injured.

30th, on Central of New Jersey, at Springtown, N. J., a freight train standing at the station was run into by a westbound passenger train, damaging both engines. Two passengers were injured. It is said that a man belonging to the freight train was sent out with a red flag, but that he wound the flag around the staff and went away and left it.

And 22 others on 18 roads, involving 6 passenger and 32 freight and other trains.

DERAILMENTS.

Defects of Road.

4th, on Colorado Midland, near Leadville, Colo., a passenger train of the Denver & Rio Grande, running over the Midland road on account of a washout, was derailed by a broken rail. Seven passengers and three trainmen were injured.

12th, on Atchison, Topeka & Santa Fe, near Wichita, Kan., a freight train was derailed by running on a bridge which had been weakened by fire, and the engine and three loaded cars were wrecked.

16th, on Great Northern, near Glasgow, Mont., a work train was derailed in consequence of the distortion of the track by solar heat, and five employees were injured.

22d, on Chesapeake & Nashville, near Westmoreland, Tenn., a mixed train broke through a trestle bridge and fell to the ground 60 ft. below, wrecking the engine and six cars. One passenger was killed and six passengers and three trainmen were injured. The wreck caught fire and the cars and their contents were burned up.

And 5 others on 5 roads, involving 3 passenger and 2 freight and other trains.

Defects of Equipment.

25th, 1 a. m. on St. Louis, Iron Mountain & Southern, at Ironton, Mo., a freight train was derailed by a broken wheel, and four cars were ditched. A brakeman was thrown off the top of the train and injured.

26th, on Northern Central, near Penn Yan, N. Y., a freight train was derailed by a broken axle and three loaded cars were wrecked; three trainmen were injured.

26th, on Santa Fe Pacific, at McLellan, Ariz., a freight train was derailed by a broken wheel, and 12 cars were wrecked and fell down a bank. One brakeman was injured.

And 20 others on 17 roads, involving 2 passenger and 18 freight and other trains.

Negligence in Operating.

5th, on Louisville & Nashville, near Pilot Knob, Tenn., a passenger train was derailed at a frog and the engine fell against a freight car standing on a side track. The fireman was killed and the conductor and engineman were injured. It is said that the track was being relaid at the point where the derailment occurred.

13th, on Chicago & Northwestern, at Chicago, Ill., a train of empty passenger cars, being backed toward the terminal station, was run into the open draw at the Chicago River, and two cars went down, one of them being nearly submerged.

28th, on Pennsylvania road, near Pittsburgh, Pa., the rear cars of a passenger train were derailed at a switch which had been imperfectly fastened, and two cars were wrecked. Eight passengers were injured.

And 10 others on 7 roads, involving 2 passenger and 8 freight and other trains.

Unforeseen Obstructions.

6th, on Cincinnati, New Orleans & Texas Pacific, near Hixon, Tenn., a work train, moving backwards, was derailed by running over a cow; the conductor was killed and a trainman was injured.

6th, 10 p. m. on Kansas City, St. Joseph & Council Bluffs, near Waldron, Mo., a northbound passenger train was derailed at a washout; the fireman was killed and six passengers were injured.

8th, on Atlantic & North Carolina, near Newport, N. C., a passenger train moving backward was derailed by running over a cow, and the parlor car was overturned. Two passengers were killed.

8th, 11 p. m., on Lake Shore & Michigan Southern, at Dorset, O., several cars in a freight train were crushed by the too sudden application of the air brakes, and eight cars were derailed and ditched. A man stealing a ride was killed, and it is supposed that the air valve had been turned by him with the intention of slackening the speed of the train so that he could jump off.

9th, on Great Northern, near Glasgow, Mont., a passenger train was derailed at a point where the track had been weakened by a freshet and the engine and first three cars were overturned. A man stealing a ride was killed and a mail clerk was injured.

15th, on Chattanooga, Rome & Southern, at Raccoon, Ga., a freight train moving backward ran over a cow, and the caboose was overturned; one employee injured.

17th, on Pennsylvania road, at Short's Mills, Pa., a passenger train was derailed by a log which had rolled upon the track from a hill, and the engine fell down a bank. The fireman jumped off and was killed; the engineman was injured.

20th, 2 a. m., on Southern Pacific, at Stanwix, Ariz., a passenger train was struck by a flood of water which suddenly came down from the mountainside, and the engine and baggage car were derailed and overturned.

22d, on Central of Georgia, near Seale, Ala., a passenger train was derailed by running into a washout. Two trainmen and two passengers were injured, one of the latter fatally.

29th, 11 p. m., on Erie road, near Lackawaxen, Pa., an eastbound freight train was derailed by a landslide and the engine and several cars fell upon and fouled the westbound track. Immediately thereafter westbound passenger train No. 7 came along and ran into the wreck and the engine and cars were ditched. Both engines fell down a high bank. One passenger and the engineman and fireman of the passenger train were killed, and 11 passengers and 10 trainmen were injured. Four cars of the passenger train and 7 freight cars took fire and were burned up.

And 7 others on 6 roads, involving 1 passenger train and 6 freight and other trains.

Unexplained.

3d, on Raritan River road, at Melfort, N. J., a passenger train was derailed, and most of the cars fell down a bank. The engine was badly damaged. Three passengers and two trainmen were injured.

5th, on Southern Pacific, near Elko, Nev., a passenger train was derailed, and a trainman and 12 passengers were injured, the passengers slightly.

12th, on Florida, Central & Peninsular, near Everett, Ga., an express car in a passenger train was derailed and, with two following passenger cars, fell into the ditch. Several passengers were injured.

12th, on New York, Philadelphia & Norfolk, at Only, Va., a freight train was derailed at a switch and ran against another freight standing on a side track, damaging both engines and three cars. One engineman was injured.

12th, on Cincinnati, Indianapolis & Louisville, at Auburn Junction, Ind., the engine of an excursion passenger train was derailed on a curve, doing slight damage. The engineman at once applied the brakes and stopped the train so suddenly that two passengers in the baggage car were thrown out. One of these was killed and the other badly injured.

13th, on Southern Railway, near Flovilla, Ga., a freight train was derailed and 16 cars were ditched. One trainman was injured.

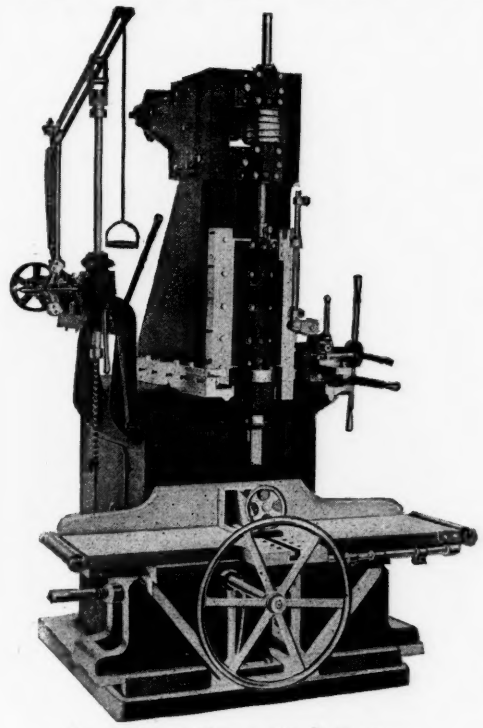
13th, on Wheeling & Lake Erie, near Martin's

Ferry, O., the locomotive of a passenger train was derailed and overturned. Three trainmen were injured.

13th, on Chicago & Alton, near Glendale, Mo., a freight train was derailed and 10 loaded cars were wrecked. Two men stealing a ride were killed and five others were injured.

16th, on St. Joseph & Grand Island, near Trimble, Mo., a freight train was derailed and the engine was overturned. Two trainmen were injured.

16th, on Southern Railway, at Louisville, Ky., the locomotive of a freight train was derailed and overturned and the engineman and fireman were injured, the former fatally.



Carse's No. 8 Hollow Chisel Mortiser—
S. A. Woods Machine Co.

16th, on Southern Pacific, at Sims, Cal., a passenger train was derailed and two passengers were injured.

18th, on New York, Susquehanna & Western, at Butler, N. J., the locomotive of a freight train was derailed and overturned and the fireman was fatally injured.

18th, on Baltimore & Ohio, near Baltimore, Md., a mixed train was derailed and the locomotive was overturned. The engineman was killed and fireman injured.

18th, on Illinois Central, at Lenzberg, Ill., a passenger train was derailed while running at full speed and the engine was overturned. The fireman was killed and four passengers were injured, one of them fatally.

21st, on Lake Erie & Western, at Brokaw, Ill., a freight train was derailed and 23 cars were ditched. The conductor was injured.

25th, on Southern Pacific, near Clark's, Nev., an eastbound express train was derailed and the engine was overturned. A fruit car, a baggage car, two mail cars and three other cars were ditched. The engineman was killed and the fireman injured.

31st, on Chicago & Northwestern, near Moingona, Ia., the westbound fast mail was derailed while running at high speed and badly wrecked. The engineman, fireman and two postal clerks were killed and five postal clerks and one brakeman were injured.

And 37 others on 28 roads, involving 6 passenger and 31 freight and other trains.

OTHER ACCIDENTS.

5th, on Norfolk & Western, at Tip Top, Va., the locomotive of a freight train was wrecked by the explosion of its boiler and the engineman, fireman and one brakeman were killed.

30th, on Missouri, Kansas & Texas, near Geneva, Tex., the locomotive of a freight train was wrecked by the explosion of its boiler, and the fireman was badly injured.

And 3 others, involving 3 passenger trains.

A summary will be found in another column.

A New Hollow Chisel Mortiser.

The engraving shows a mortising machine lately brought out by the S. A. Woods Machine Co., of Chicago, known as the Carse No. 8 hollow chisel mortiser. This is said to be the latest design on the market, and is the result of experience gained in designing and building several machines of this class. With all the handiness of the old-style, flat-chisel mortiser, it has a speed of from four to ten times as great. The tool frame can be easily moved across the timber, and so the machine is very handy for working wide sills. If it is desired to end-tennon sills, handling to a cut-off saw can be saved, as no previous cutting off is necessary.

The main frame is entirely self-contained, requiring no special foundation. It is massive, with a broad base. The tool plunger frame travels with a minimum of friction and is said in this respect to be superior to any other machine of the class yet designed. The feed mechanism is new and is entirely within the enclosed frame of the machine. The feed of the tool plunger is automatic, with increased speed for the return, and works to stops for any desired stroke. The tool plunger is driven by direct gears and is positive and quick in action. The table design is new, and has great solidity. It adjusts vertically on inclined planes by the end screw and is fed by hand wheels to stops. The machine is also built with long traveling timber carriage feeding by power and by hand to stops. Prices and further information can be had by addressing the company.

The Bullock Generator for Electric Railroads.

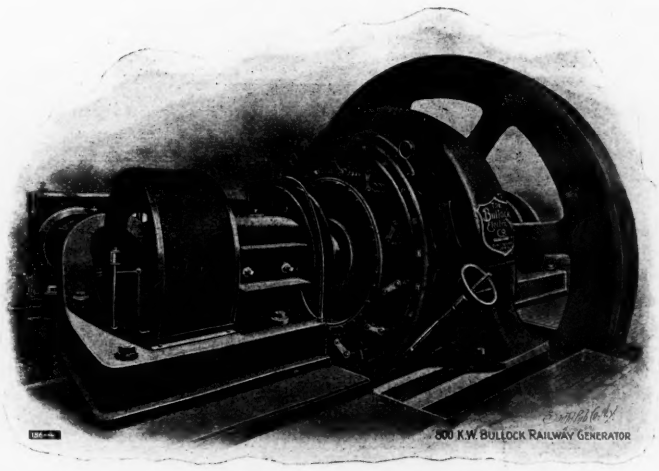
The Bullock Electric Mfg. Co., of Cincinnati, has just completed some generators for street railroad work, the largest being an 800-k.w. machine for the Oakland Rapid Transit Co., of Oakland, Cal., shown herewith. The motors and dynamos made by this company for ten years are well known, and in the recent designs for railroad generators, the principal features have been retained and some improvements also made. In January last, additions were made to the company's works and with the new designs, they have entered the railroad field.

One of the improvements is an arrangement for oscillating the brush-holder mechanism in a direction parallel to the shaft. The movement is slow and results in constantly changing the line of travel over the commutator face and thus removes the tendency to cut or groove it. The action is the same as secured by the end play of an armature in a belted generator.

The pole pieces and coils may be removed without disturbing the yoke or armature, and with two of them removed, it is possible to remove one or more armature coils. These coils are made of continuous bars of copper without joints between the commutator connections which materially adds to the life of the machine. These coils are all thoroughly insulated, pressed and baked before being placed on the core, no additional core insulation being necessary.

All armatures are thoroughly ventilated by slots perpendicular to the shaft through which the air rushes when the machine is in operation.

The machine here illustrated operates at a speed of 80 revolutions per minute and at this speed develops 550 volts at no load. It is over-compounded for a rise of 50 volts at full load making the full load voltage 600.



The Bullock 800 K. W. Engine Type Generator.

The Henrikson Flue Cutter.

The engraving shows the Henrikson pneumatic flue cutter for 4½-in. flues. This is a recent development and has been found so successful in trial work that the Chicago Pneumatic Tool Company is putting it on the market, and it has been adopted as standard on the Chicago & Northwestern. It is made in various sizes to suit the requirements of the customer.

The cutting wheel is fed against the flue by the cylinder and piston arrangement shown about the middle of the shaft. The air pressure passes through the motor to work the piston and the air motor turns the cutter at the same time. The machine will cut flues either inside or outside the flue sheet and cuts a 4½-in. flue in about 20 seconds. Locomotive flues can be cut in a correspondingly less time. There is not only this saving of time as compared with hand work, but the machine cuts the flue close to the sheet, making but little waste.

The Henrikson Pneumatic Flue Cutter.

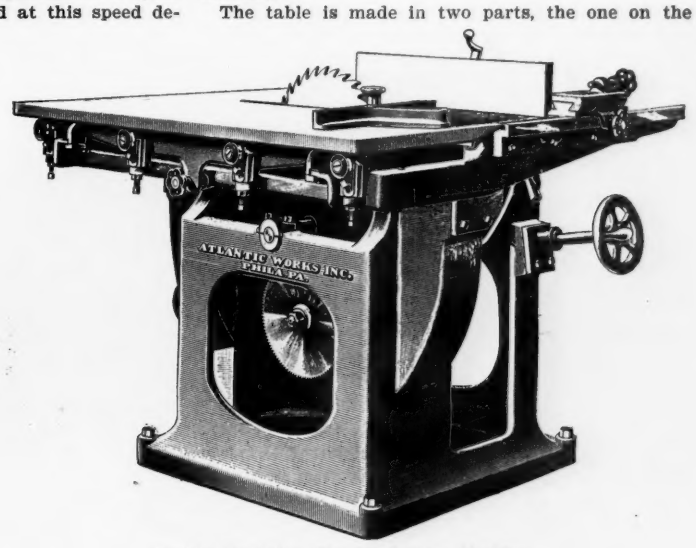
A New Double Revolving Circular Sawing Machine.

The illustration shows a double revolving circular sawing machine recently brought out by the Atlantic Works of Philadelphia. It is well adapted for use in pattern shops, or any establishment where frequent changes are to be made in the character of the work performed.

It has two steel arbors mounted in a heavy frame which revolves around a central axis, so that either the cross-cutting or the ripping saw may be brought into action by a few turns of the hand wheel, shown in front. Both arbors, one carrying a rip saw, the other a cross-cut saw, are driven by the same belt, from a counter shaft placed directly below the machine; or by the use of idlers, furnished, the counter shaft may be placed on the floor at one side of the machine.

The central shaft is turned by means of a worm gear and hand wheel, and the saw can be adjusted so as to cut through to is full capacity, or any less amount.

The table is made in two parts, the one on the right hand side of the saw being stationary, on which is fitted a ripping and beveling gage of rapid and fine adjustment. The left hand section, which is 19 in. wide, is used for cross-cutting. One side moves on anti-friction rollers, the other runs in parallel planed guides, which always keeps the table movement in line with the saws. This table is also provided with a cross movement to admit of the use of grooving cutters in place of the saws. The table can be adjusted to an angle of 45°, and instantly brought back to a right angle. There is a graduated quadrant on the left section of the table, which admits of cutting mitres in either direction. Further information and prices can be had from the makers.



Double Revolving Circular Sawing Machine.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
PUBLISHED EVERY FRIDAY,
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

Several times within the last three months we have published more or less of the facts concerning the agreement of the Westinghouse people with the Russian Government for the use of the Westinghouse brake in that country. Nothing, however, has yet been published so complete as the text of the order issued by the Ministry of Ways and Communication, which appears on another page of this issue. It is worth while to read that order with some care, for several reasons. After reading it carefully one need have no misapprehension, we judge, as to the scope of the order. This brake is to be applied to the engines and freight cars circulating on the Russian system of standard 5-ft. gage railroads. This covers not only the state railroads, but the private railroads. The necessary credit for the state railroads will be asked "and the necessary means found for the private railroads." This covers the Transcaucasian Railroad as well as Russia in Europe. Private railroads will be permitted to order their brake apparatus direct from the Westinghouse Company on certain conditions, or they may order through the management of the state railroads; but independent contracts must be submitted to the Ministry of Ways and Communication and must be justified by sufficient reasons. It is interesting to see that it is proposed to establish instruction cars provided with drawings, models and installations, and that the Westinghouse Company is to prepare one such car in order that it may make a tour over the state railroads in the charge of "skilled persons from the said firm." It will be seen that the liberal and sagacious policy of the Westinghouse Company in providing for careful instruction in the use of the air brake as followed up for years past in this country, now bears fruit in Russia. We suppose that nowhere else, either in Great Britain or on the Continent of Europe, has anything been done like the work of the Westinghouse instruction cars in this country; which accounts, partially at least, for our advanced place in the art of train braking.

One of the most obvious features of a transportation line connecting large cities is the great cost of land in the city as compared with the cost in the country. But though the most obvious feature, it is the most easily forgotten—or concealed—by writers of railroad prospectuses. It requires prodigious courage to tell a company of farmers who have with difficulty raised a million dollars for a 40-mile railroad that it will require another million to provide for it two miles of terminals. The hearings recently held by the New York State Commerce Commission, a special commission appointed by the Governor a year ago, bring into prominence the fact that the same condition exists in the case of the Erie Canal. Shippers of flour from the Northwest complain before the Commission that they cannot send flour by the canal, and the boats have carried practically none of this commodity for years; but, say the shippers, the canal could carry the flour, and at very low rates, if only free dockage for boats and free storage for large quantities of flour could be secured at New York. And the city (or the State) should, of course, provide the room at its own cost, for the benefit the commerce would bring. The promoters of a scheme for putting on some new canal boats join in this demand; and they claim that it is a crime that dock room now used by railroads in New York harbor is not reserved for canal boats. The Commission has not yet investigated the whole subject, and the merits of this claim cannot, perhaps, be accurately estimated; but as, presumably, the railroads pay a suitable rent for the water front which they occupy, it will not be out of place to suggest to the canal boat promoters that they estimate what price they will have to charge for carrying flour when they furnish the same terminal facilities that are furnished by those who handle the flour traffic now. As long as it is impossible to reduce the high rent of land in New York somebody has got to pay high terminal charges on flour; and if it is proposed that the burden shall be shifted from the consumer of the flour to the taxpayers of the state of New York. there will be a gain in stating the case fairly at the outset. Until the Erie Canal is enlarged, it would seem at least doubtful whether the company that proposes to carry flour by boat can compete with the railroads, even with terminal facilities furnished for it free by the State. There is some advantage in avoiding the re-handling of flour in barrels, and the fact that grain is moved in larger volume than flour is likely always to make it more profitable for large boats to handle grain than flour. In bidding for grain, the railroads seem to have been able to beat the canal whenever they have set out to do so, for several years past, and they ought to be able to do as well with flour.

Chicago River.

The crowded condition of the river at Chicago has become pretty generally known through discussions of the needed improvements in the Chicago harbor. So that it is hardly necessary to say that the plat shown elsewhere in this issue is but a fair sample of how that stream is obstructed in numerous places by center pier bridges and contracted dock lines, while at three points tunnels cross the river whose crowns limit the draft of vessels to 16 ft. In June of last year Mr. G. A. M. Liljencrantz, in a paper before the Western Society of Engineers, showed by maps that many such places must be improved before the Chicago River will become navigable for modern lake vessels. While it will probably be a long time before all the contemplated improvements of that river are completed, some of the dredging is now in progress and possibly by next year funds will be available for several new bridges.

The last Congress fixed the depth of the channel in the Chicago River at 22 ft., and the minimum width at 120 ft., and made an appropriation for straightening and deepening the channel. No part of the appropriation, however, can be used for removing center pier bridges or lowering tunnels, which work must be done by the City. The City officials have been negotiating for some time with the street railroads, which use the tunnels exclusively, but so far no definite arrangements have been made for sharing the expense of the work. There are also said to be more than 50 swing bridges, most of them quite old, that will need to be replaced with some kind of lift bridges, and possibly the requirements of the Sanitary District for an increased channel will hasten this part of the work.

All of this will cost a great deal of money, but the expenditure seems necessary if the lake traffic is not to be permanently diverted to other ports, and in this connection the statistics of the marine commerce of Chicago are interesting. In 1898 this commerce amounted to 15,116,000 tons, carried in 18,512 vessels, making the average cargo 817 tons. The number of vessels entering and clearing at Chicago exceeded that of the port of New York by about 5,000 vessels, but, of course, the tonnage was less. The tonnage, however, equalled that of the port of London and exceeded the tonnage of Liverpool. There has been a constant decrease in the number of vessels entering the port of Chicago during the last thirty-five years, but the average cargo and total annual tonnage has been constantly increasing. The largest entrance and clearance of vessels for Chicago occurred in 1869, when 27,634 vessels carried 6,273,000 tons, or an average cargo of only 227 tons. Could the large modern lake vessels enter that port the tonnage would doubtless increase very materially, while the number of vessels entering and clearing would decrease. It is therefore held that, although the highway and railroad traffic on the bridges crossing the Chicago River is now large and will increase proportionately with the growth of the City, the delays caused by the opening of bridges for the passage of vessels have probably reached a maximum; decreasing as the obstructions in the river are removed and large vessels are substituted for the smaller ones now used.

July Accidents.

Our record of train accidents in July, given in this number, includes 96 collisions, 116 derailments and 5 other accidents, a total of 217 accidents, in which 45 persons were killed and 201 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

COLLISIONS.

	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	21	0	1	22
Misplaced switch	3	2	2	7
Failure to give or observe signal	4	4	7	15
Mistake in giving or understanding orders	0	3	0	3
Miscellaneous	3	4	8	15
Unexplained	11	9	14	54
Total	42	22	32	96

DERAILMENTS.

Broken rail	2	Too quick application of air brake	2
Loose or spread rail	1	Derailing switch	1
Defective bridge	2	Bad switching	3
Defective switch	2	Unfastened switch	1
Defective frog	1	Animals on track	3
Bad track	1	Landslide	2
Broken wheel	4	Washout	6
Broken axle	12	Malicious obstruction	1
Fallen brakebeam	1	Accidental obstruction	3
Failure of drawbar	3	Flood	1
Broken tender	1	Mischievous application of air brake	1
Broken car	2	Unexplained	54
Misplaced switch	3		
Careless running	1		
Track repairers	2		116

OTHER ACCIDENTS.

Boiler explosion	2
Various breakages of rolling stock	2
Other causes	1
	5
Total number of accidents	217

A general classification shows:

	Collisions.	Derailments.	Other accid's.	Total.	P. c.
Defects of road	0	9	0	9	4
Defects of equipment	22	23	4	49	22
Negligence in operating	40	13	0	53	24
Unforeseen obstructions	0	17	1	18	8
Unexplained	34	54	0	88	42
Total	96	116	5	217	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other accid's.	Total.
Passenger	36	33	3	72
Freight and other	123	84	2	209
Total	159	117	5	281

The casualties may be divided as follows:

Killed.	Collisions.	Derailments.	Other accid's.	Total.
Employees	12	16	3	31
Passengers	2	7	0	9
Others	1	4	0	5
Total	15	27	3	45
Injured.				
Employees	45	54	1	100
Passengers	31	63	0	94
Others	2	5	0	7
Total	78	122	1	201

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road	1	13	1	11
Defects of equipment	0	0	3	6
Negligence in operating	2	39	13	47
Unforeseen obstructions and maliciousness	4	18	5	16
Unexplained	2	24	9	20
Total	9	94	31	100

Twenty-seven accidents caused the death of one or more persons each, and 41 caused injury but not death, leaving 149 (69 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with July of the previous five years shows:

	1899.	1898.	1897.	1896.	1895.	1894.
Collisions	96	76	47	35	33	61
Derailments	116	80	97	65	52	75
Other accidents	5	4	2	3	3	12
Total accidents	217	160	146	103	88	148
Employees killed	31	30	16	23	16	43
Others killed	14	10	9	79	9	21
Employees injured	100	95	56	33	48	95
Others injured	101	37	60	154	28	55
Passenger trains involved	72	50	44	33	27	60
Average per day:						
Accidents	7.00	5.16	4.71	3.32	2.84	4.77
Killed	1.45	1.29	0.81	3.29	0.81	2.06
Injured	6.48	4.26	3.74	6.03	2.45	4.56
Average per accident:						
Killed	0.21	0.25	0.17	0.99	0.28	0.43
Injured	0.93	0.83	0.70	1 82	0.86	1.01

Passengers suffered fatal injury in seven different accidents in July, an unusual number. The three most serious accidents, those at Newman, Cal., on the 10th, at Westmoreland, Tenn., on the 22d, and at Lackawaxen, Pa., on the 29th, were all accompanied by fires.

The Lackawaxen disaster was an unusually striking case, and, being fully reported in the New York papers, aroused considerable comment. One astute editor remarked that it was an important lesson as illustrating the need and value of a block system!

An officer of the road, in replying to this, said that the storm which blocked the track was of a very unusual character and that the provision made by the company for patroling the track at that point was well up to the best standard; thus showing that the accident was about as nearly unavoidable as we may ever expect to find.

The wreck at Newman, Cal., attracted considerable attention because the passengers were almost all women (school teachers) and because the foremost sleeping car was next to the engine, with no baggage car between. One of our contemporaries publishes a copy of the train order on which this Southern Pacific special was run. This order directed the train to pass two freight trains, running in the same direction, whenever it should overtake them. Commenting on this and on some of the evidence taken by the coroner, which is so fragmentary as to be useless on many points, our contemporary proceeds to apportion the blame for the collision among three different men. We are not equal to the task of making this clear to our readers, from the statements given; but there is one thing quite clear, and that is, that, according to a standing rule of the Southern Pacific, an extra train, like that which here ran into a freight at a station, should always approach such stations under full control. The breach of this one rule appears to be the vital point that the superintendent must consider in dealing with this accident. A despatcher's order requiring a passenger train to overtake and pass a freight at an indefinite place is, indeed, an example of unscientific railroading, but with suitable time-interval regulations and with the station rule above cited it is not necessarily dangerous. The circumstances of this case seem to indicate, however, that here, as at hundreds of other places where a rule of that kind is ostensibly in force, all hands agree in ignoring it whenever their individual judgment tells them that they can do so with safety. Just here is one of the important differences between the ordinary or old-fashioned method of running trains, and the space-interval method. With the time interval, and dependence being constantly placed on rules like this, the temptation to vary from the rules occurs every day and even the trainmaster and despatcher yield to it, thus encouraging trainmen to do the same. With the space interval the procedure is so much more simple and the danger of altering it without definite authority is so much more easily seen by everybody, that no one dares to disobey the letter of the rule.

Of the accidents to other than passenger trains, the most noticeable were the drawbridge derailment at Chicago on the 13th, the collision at Haverhill, O., on the 18th and the derailments at Dorset, O., and Moingona, Ia. The Dorset case, where a tramp appears to have tampered with the air brake, without any particularly malicious motive, adds a new variety to our list of causes of derailments. The Haverhill case is a good illustration of the value of the block system and more particularly of the value of the excellent regulations for making meeting points, under space-interval rules, at non-telegraph stations, as in force on the Chicago, Milwaukee & St. Paul, the Chesapeake & Ohio, and other roads. The Moingona derailment, although not affecting passengers, is noticeable by reason of the high speed of the train and the completeness of the wreck. As far as preventive measures are concerned, this is to be treated as practically a passenger train accident; but it is said that the investigations made by the officers of the road threw very little light on the cause of the derailment.

The number of electric car accidents reported in the newspapers in July is unusually large, 22; eight persons are reported killed and 83 injured. At least three cases, all of them fatal, are reported to be rear collisions at night, due to the absence of a tail light. Cars were unexpectedly deprived of the electric current while at rest; and, there being no oil lamps in the cars, and the street not being well lighted, a second car overtook the standing one. A butting collision, killing three persons, on the Akron, Bedford & Columbus, is reported to have been due to a mistake in giving or understanding a running order; and in the report of the investigation it is said that the despatcher, or person in charge of the movement of cars, kept no written record of his doings. Another butting collision is reported as due to the failure of the motorman on the foremost of two or more cars, running in the same direction, to notify an opposing car, at a meeting point, that he was followed by other cars.

Annual Reports.

Atchison, Topeka & Santa Fe.—The annual report for the 12 months to June 30, of which proof sheets are now at hand, discloses a substantial advance over the favorable results attained in each of the previous years of the present company's operations. Though the outcome of the corn crop in the company's territory was not especially favorable last year, while the yield of winter wheat in Kansas this year decreased about 25 per cent., the expansion in earnings was heavy, amounting to $1,299,400, following an increase in the previous year of $5,581,000. The last six months of the fiscal year was marked by a steady reduction in the abnormally large charges for improvements of the roadway and equipment, such heavy expenditures having been a feature of the company's policy since the lines were taken over from the receivers. The reduction in working charges thus brought about permits a gain to be shown in net earnings, of $2,199,000, practically the same amount as recorded in 1898. The comparative statement of income for the past two years is shown below, the average miles operated in 1899 being 7,033, and in 1898, 6,936:

Earnings:	1899.	1898.	Inc. or Dec.
Passenger	$8,126,141	$7,347,362	I. $778,780
Freight	29,492,587	28,588,717	I. 903,870
Mail and express	2,424,349	2 207,883	I. 216,461
Miscellaneous	470,429	1,070.132	D. 599,712
Total earnings	$40,513,498	$39,214,099	I. $1,299,399
Operating Expenses:			
Maint. of road & struct.	$7,672,108	$8,281.398	D. $609,290
Maint. of equipment	4,810,796	4,659,278	I. 151.518
Transp'tation & traffic	14,035,783	14,468,015	D. 432,231
General expenses	1,087,994	1,097,644	D. 9,650
Total oper. expenses	$27,606,681	$28,506,335	D. $899,654
Net earnings	$12,906,817	$10,707,764	I. $2,199,053

The loss in miscellaneous earnings is explained as due to a change in the accounting methods, by which only the net balances of car mileage, locomotive, car and track rentals and switching charges are carried into the accounts. On the same basis as in last year's report, there would have been a small gain in miscellaneous earnings and transportation expenses would have increased $190,000, net earnings of course, not being affected.

The large gains in revenue enabled the company to put its shares on the dividend list during the past year, two dividends, one of 1 per cent., and the second of 1¼ per cent., on the preferred shares, of which there are over $114,000,000 outstanding, having been paid, of which the first, however, came out of the surplus earned previous to the beginning of the present fiscal year. In mentioning these dividends it should be recalled that the Atchison lines were taken over from the receivers only in January, 1896, and the fact that it was possible to pay dividends on the large capitalization, within 2½ years of the close of the receivership period, indicates not only that the company has prospered and increased its traffic and revenue, but also that the reorganization placed the capitalization of the new company on a reasonable basis. Indeed, the reorganizers built better than they knew. Although they provided that interest on the $52,000,000 of adjustment bonds outstanding should not become a fixed liability until 1900, the company was able to make an initial payment on this issue out of the surplus earned in the first full fiscal year, while, as stated above, the second fiscal year ending June 30, 1898, provided a balance sufficient to pay a stock dividend. In 1899, with $2,300,000 added to the surplus, this shows a balance equivalent to 3⅝ per cent. on the preferred stock. The growth of the company may be summarized by stating that the balance of $1,452,445 shown after the payment of fixed charges in 1897, increased to $3,890,425 in 1898, and to $6,241,838 in 1899. The income account of the latter year is summarized below:

Gross earnings from operation	$40,513,499
Operating expenses, taxes and rentals	29,332,964
	$11,180,535
Receipts from other sources	249,435
	$11,429,970
Fixed charges	5,188,132
Net income	$6,241,838
Accrued interest on adjustment bonds	2,153,840
	$4,187,998
Preferred dividend of 1¼ per cent	1,427,071
Balance	$2,760,927

The net earnings as reported are after including in expenses heavy charges in each of the years for extraordinary improvements. Chairman Walker, in the 1897 report, outlined the policy of the company then entered upon for the permanent improvement of the property and its equipment, by the reduction of grades, renewal of wooden bridges with metal, relaying of the track with heavier rails, etc., and stated that as much of the cost of the work as possible would come out of current earnings, so that capital accounts would not be burdened with the charges for the improvements except in cases where it would be unjust to do otherwise than provide for them by issuing new capital. The heaviest improvements were for the most part brought to an end at the close of the last calendar year.

A reduction of grades on the Gulf, Colorado & Santa Fe, estimated to cost $1,290,000, is in progress, $990,000 having already been expended. Besides $3,919,726 expended on capital account for improvements in 1899, $880,000 was charged for new lines and terminals and $2,462,000 was also provided for the purchase of the San Francisco & San Joaquin Valley Railroad stock, that line giving the company an entrance into San Francisco. "It is expected that through trains will be running between Chicago and San Francisco by the close of the present calendar year; and it is believed that when this road is completed it will be self-supporting, besides controlling for your existing lines a much larger share of transcontinental traffic than they have heretofore enjoyed." Several pages of the Chairman's remarks are given up to an account of the new branches under construction, besides the San Francisco line. There are about 11 of these lines, the capital expenditures in the year on their account being $880,000.

Outside of the change in transportation expenses, explained as being a matter of accounting, the saving in expenses was accomplished through a reduction of the cost of maintenance of way, but very considerable betterments were made in the year. Indeed, the cost of maintenance per mile worked figures out as $1,091 (against $1,194 in 1898), which must be considered high, considering the many short branches, and the light traffic on long stretches of road. The amount charged in operating expenses for maintenance of equipment was $2,032 per engine, $715 per passenger car and $74 per freight car. The cost of safety appliances (air brakes on 31 engines, and 831 cars and couplers on 6,538 cars), was $249,874, of which $89,627 was charged to capital and $160,247 to expenses.

There are now 27,026 freight cars equipped with air brakes and 23,150 with automatic couplers, out of a total of 28,486.

The balance sheet shows many changes incidental to the operations of a progressive company actively engaged in developing and protecting its property. The total funded debt outstanding, including $51,346,000 incomes, is $181,605,750, or $25,403 per mile, with a yearly fixed charge of $1,022 per mile, while the gross earnings per mile in 1899 were $5,761.

We have space to refer only briefly to the traffic operations. Ton-miles increased nearly 113½ millions, while freight-car mileage decreased 16,501,000 miles. The tons per freight train-mile, shown in the report for the first time, are given as 161½, against 142 tons in 1898, an increase of 13.7 per cent. The tons of freight per loaded car increased to 11.38, or 6¼ per cent. Ton-mile receipts fell from 1.029 cents to 1.019 cents, but freight train-mile revenue was higher by 12.7 per cent., or $1.65, against $1.46 in 1898. The changes in the other accounts were not material.

Illinois Central.—A considerable expansion in the mileage of the Illinois Central has been going on in the last four or five years; in 1898, for instance, 645 miles, or over 20 per cent. was added to the lines worked. But in the fiscal year ending June 30 there was a decrease in the miles worked. A year ago 3,808 miles was included; the total is now reduced to 3,679 miles, although a number of branches have been built and taken over. The explanation of the decrease is that, on July 1, 1898, the 140-mile leased Yazoo branch was surrendered to the Yazoo & Mississippi Valley road, which can now work it advantageously through the building of various connecting lines. The transfer takes the branch out of the Illinois Central accounts, but the Yazoo & Mississippi Valley, with its 955 miles of road, is a controlled line, though its operations are reported separately.

The expansion of the system, in the matter of additions to mileage, is not over, for last year saw a new development of this policy, in the beginning of construction work on many new lines, of varying length, to serve as feeders, which will bring the miles worked above the high figure of 1898. The most important of these new lines is the division from near Fort Dodge to Council Bluffs, which gives the company a low-grade line to Omaha. Construction advances already reach $1,225,000. Another line also reaching a new district for the Illinois Central, is the extension into the coalfields of Northern Alabama, undertaken to secure a cheap supply of coal for the company's southern lines, and for the New Orleans trade. Besides these new branches, the 90-mile St. Louis, Indianapolis & Eastern, from Effingham, Ill., to Switz City, Ind., was acquired by purchase of the securities (at a cost of $673,400), this being the plan commonly followed in increasing the mileage from the 2,888 miles operated in 1895 to the 3,808 miles operated June 30, 1898, practically none of that nearly 1,000 miles being new road.

The company increased its gross receipts by $796,900, or 2.92 per cent. This was more than offset, however, by an expansion in working charges of $840,225, or 4.84 per cent. With miscellaneous income 17 per cent. better than in the previous year, the balance available for charges increased, and the surplus for dividends was $4,331,500, leaving a balance of $1,519,000, practically all of which was appropriated for betterments. The main items of the income account for the last two years are given below:

	1899.	1898.
Gross earnings	$28,114,690	$27,317,820
Main. way	4,283,497	4,255,225
Main. equip	3,195,937	3,132,720
Transportation	10,723,848	9,975,112
Taxes	1,358,980	1,292,413
Total expenses	19,562,262	18,655,670
Net earn	$8,552,428	$8,662,350
Total net income	11,133,506	10,898,719
Rentals and interest	6,802,004	6,510,064
Balance	$4,331,502	$4,388,655
Dividends	2,812,500	2,625,000
Surplus	$1,528,002	$1,763,655

The capital stock was not changed during the year, but by the exercise of an option on $7,500,000 held by bankers, the amount outstanding will be increased to the full $60,000,000 authorized. The contract for the sale of this stock at par, although it has ruled in the market considerably above that price for nearly two years, selling as high as 122 in January, and ruling about 115 for some time past, was part of the financing arrangements of the two chief acquisitions in the period since 1895, the Chesapeake, Ohio & Southwestern and the St. Louis, Alton & Terre

Haute. To take up the large floating debt incurred in this purchase, $10,000,000 new stock was authorized and offered to stockholders at par, in November, 1895. On account of the business depression, little of it was taken, and the balance not subscribed for, was disposed of at par to bankers who advanced the company credit up to $10,000,000, they securing the option at par on the balance of $7,500,000 of new stock, an option which they have recently exercised, with the company's credit testified to by a premium of about 15 per cent. on the stock, it was delivering at par. A somewhat similar arrangement was made respecting the sale of divisional lien bonds on the new lines, and several millions of these have recently been delivered at a price representing a heavy discount on ruling quotations. These facts illustrate some of the ironies of fate. While these contracts seem, in one sense, to have turned out costly, they enabled the company to finance its heavy acquisitions, without any strain, to avoid an excessive floating debt which might have become troublesome or imperilled the continuity of dividends, and prevented that enhancement of credit, which has been reflected in advancing quotations for its securities.

President Fish has been a strong advocate of the development of New Orleans, and has himself done much to forward that development, not only by argument and papers on many occasions, but by authorizing heavy expenditure in improving the terminal facilities of the port. In the present report, he does not omit to state some of the reasons, as he sees them, for looking forward to a great increase in the export grain business out of New Orleans, laying particular stress on the closer proximity of the city, as compared with New York, to the States producing the exportable surplus of grain. He points out, however, that only 536,841 tons, or about a fifth of the total of 2,715,981 tons of grain, flour and mill products, carried by the Illinois Central lines in the last 12 months, were exported via New Orleans. To promote the movement of grain to that port, 500 40-ton grain cars have been ordered to be ready to carry the present crops.

The additions to the equipment actually brought into service consisted of 1,506 freight cars; 26 engines were purchased to keep the inventory intact, that number having been destroyed. The total engine equipment, 763, was in service at the end of the year. One interesting feature of the company's reports is the detailed account of the age and classification of its engines and the tonnage capacity of its cars. From these tables it appears that all of the engines condemned were built before 1881 and were 8-wheel engines, being replaced by 10-wheelers and 6-wheel switching locomotives; of the total number now in service, 435 have been built in, or since, 1890.

The expansion of the system in mileage, and the improvement of the efficiency of the equipment, have by no means absorbed all the energies of the management. Reductions of grade, and other betterments to the roadway and structures, have been extensive. In 1898 practically all the surplus earned over dividends was set aside for improvements. This year the same policy has been carried out.

The freight statistics show that with an increase in the tonnage of 6.48 per cent., and in ton-miles of 2.84 per cent., the freight train miles increased only 1.26 per cent., the average train load gaining 3.21 tons to 209 tons. The ton-mile receipts were 6.88 mills against 6.95 mills in 1898, but receipts per train-mile increased slightly, about one-half per cent. The car mileage reports show some interesting changes. Thus, although loaded cars ran 3,800,000 additional miles, it was possible to reduce the empty car miles by 4,030,000 miles.

Missouri, Kansas & Texas.—As late as 1897, this company reported a deficit in its operations of $286,-353; this was turned into a surplus of $437,679 in 1898, which is now further increased to $487,096 by the results in the fiscal year to June 30. These figures show a growth in prosperity, which has reached a point where, counting in its other income, it is able to show a dividend of about 4¼ per cent. earned on its light capitalization. The ability to increase the surplus, and to change so heavy a deficit two years ago into a balance on the right side of about half a million dollars, has not been due altogether to increased gross earnings. The success in keeping down expenses has been a very important contributory cause. Indeed, in 1899, the improvement in net earnings was due wholly to the savings effected in working cost, as will be seen by the comparative statement of the financial results in the last two years, given in the following table, the figures covering 2,200 miles:

	1899.	1898.	Inc. or Dec.
Gross earn.....	$11 930 334	$12,047,207	D. $116,903
Oper. exp. and taxes..	8,012,828	8,182,388	D. 169,560
Net earn.....	$3,917,506	$3,864,849	I. $52,657
Total net income.....	3,979,094	3,933,939	I. 45,155
Int. and rentals.....	3,430,411	3,427,170	I. 3,241
Adjustments	.....	32,012	D. 32,012
Balance	$548,683	$474,757	I. $73,925

The loss in gross is partly explained by the fact that the increase a year ago, was $569,000, but it also partly due to a loss of live stock business, somewhat consequent on the new arrangements in the Indian Territory. Besides this, it would seem as if the traffic must have been affected by the competition of the Kansas City, Pittsburgh & Gulf, which was in operation throughout the year from Kansas City to the Gulf of Mexico, between which points the Kansas & Texas extends at varying distances from the new road. The competition of the latter was perhaps as severely felt in the matter of rates, as in the direct loss of tonnage.

Freight train mileage decreased in greater proportion than the tons one mile, or by about 5 per cent., so that there was an important saving in freight train expenses. A different result is shown in the passenger accounts. While the number of passengers carried, the miles run and the revenue increased, the effort to popularize a new express train to the Southwest resulted in running a good deal of extra train-mileage, while as this new service was in operation only about two months of the fiscal year, it had not drawn what is considered to be its fair proportion of the business. The passenger car and train-miles, therefore, increased more than did the business done, so that the passenger train statistics do not reflect the advance in the economical working so evident in the figures of freight business. The more significant statistics of freight and passenger traffic follow:

	1899.	1898.	Inc. or Dec.
Tons moved	3,594,500	3,568,825	I. 25,675
Tons one mile 1,005,777,000		1,040,700,000	D. 34,923,000
Ton mile rate.....	c.093	c.092	I. .001
Frt. train miles.....	5,712,340	6,018,848	D. 306,508
Pass. carried	1,471,070	1,457,548	I. 13,522
Pass. one mile.....	82,422,598	89,525,500	D. 7,102,900
Pass. train miles.....	2,749,268	2.644,284	I. 104,984

More than the total reductions in the year's working charges were effected in the cost of transportation. The decrease in this item was $210,000 last year, this saving following one of $104,500 in 1898, when ton-miles increased heavily. The attention given by the officers to economical working is thus bringing large and direct results.

Considerable improvements to the roadway were carried on during the year; 156 miles were ballasted, 83 miles of embankment widened, 13 miles of sidings built and all the wooden bridges north of Denison, Texas, have now been replaced with steel, and this work is making progress in Texas. It is suggested that the company may find it advisable to build a 50-mile line, to reach San Antonio. During the year, 11 miles of branches were built to connect with Jefferson City, Mo., and new coal fields in Kansas and the Indian Territory. The cost of this work was met by an issue of $220,000 bonds, and the company continues free from floating debt.

New York, Ontario & Western.—In the year ending June 30 last the New York, Ontario & Western Railway earned gross $4,346,163, the increase over the year before having been just over 11 per cent. The working expenses were $2,835,861, having increased a little less than 5½ per cent. The net earnings after deducting taxes were $1,376,053, an increase of 23.63 per cent. The balance of net revenue carried to the profit and loss account amounted to $686,364; last year it was $402,460. Beginning with the new fiscal year it will be the policy of the company to include in working expenses every expenditure except the cost of such extensions as may be necessary or of such actual additions to motive power and equipment as increase the earning capacity of the company or produce new revenue.

The increase in freight earnings amounted to 12 per cent. and the increase in passenger earnings to 7⅛ per cent. The transportation of coal yields more than half of the total freight earnings, namely, $1,-923,503. This item increased 15.44 per cent. last year, and was about $340,000 more than in 1895. The local freight earnings are next in importance, but do not show much increase, looking back over a series of years, although the General Manager says that local industries show great activity and new ones are starting up. With regard to through traffic he says that the eastbound rates on grain have been very low and the company has declined to participate in any rate lower than 17 cents from Chicago to New York. The milk traffic of this road is important. Last year the earnings from this traffic amounted to $484,491. The earnings per train-mile from milk amounted to $1.46. During the year under review several manufacturers of milk products established plants along the line, and it is believed that the increase in this traffic, which for some time has been at the rate of about 12 per cent. a year, will continue.

On May 1, 1898, local passenger rates were reduced from three cents a mile to two cents. The number of passengers carried has increased since then as compared with previous years about 43 per cent., and there has been a small increase in revenue. Meantime, this reduction in the local passenger rate has stimulated local freight earnings.

The working expenses in 10 years have fallen from 76.55 per cent. of the earnings to 65.25 per cent., and this has been during a period of continued improvement of the road and considerable charges of improvements to working expenses. Obviously, the greater efficiency of the rolling stock has been an important element in this. Since 1888 the average train load has risen from 123 tons to 276, and the tons per car from 7.20 to 11.47. In making up these figures the miles run by pushing or assisting engines have been counted as train-miles. The gross earnings per mile of road have risen since 1887 from $4,048 to $9,046, and the net earnings per mile from $768 to $2,864. Altogether, we feel justified in renewing our congratulations to the present management for the steady progress which has been made in the restoration and development of this property.

Long Island Railroad.—The Long Island Railroad has an interest peculiarly its own. The present management succeeded to a difficult financial situation in the burden of fixed charges relatively to earnings. Then there was the further complication of the fact that the region served is one from which revenue is to be drawn by local service, and that principally passenger service. The whole territory is practically suburban country and the entire system lies on an island, cut off from all through business. The development of the local business had been impeded by the policy of the former management, which, to say the least, did not make the road popular, and did not help to build up the beautiful suburban region as it should have been built up. Another peculiarity of the situation is that the bulk of the earnings must be made in the summer, and the road must be worked for several months in the year at an actual loss. Further, the intense and growing trolley competition about the western end of the system had to be dealt with, and still further, while the railroad does an enormous suburban business it is handicapped by having no terminus in New York City. Its business must be delivered to the downtown district either by a long ferry or by a supplementary journey on the elevated railroads already overcrowded. Naturally, the short time which the present management has been in control has not been sufficient to develop entirely the new policy and secure the results to flow from that policy, but headway is being made.

In the annual report now at hand President Baldwin sums up the year by saying that it has "been eventful and encouraging. The extra train service, inaugurated in 1898, has been continued. The long-haul business has increased, and there is every evidence of development in those sections of the island beyond the reach of competition. A constantly increasing business must result from the improved facilities provided. More trains, better equipment, higher speed, increase in use of hard coal (50 per cent. of the mileage), improved roadbed, have all added to the expense of operation, but have produced satisfactory results."

Such a policy, while building for the future, does not make for immediate improvement in net earnings. In gross, however, there has been a substantial growth, as will be seen by the following summary of gross earnings, net income and surplus for the last three years:

	Gross Earnings.	Total net Income.	Surplus.
1899	$4,622,475	$1,270,146	$250,071
1898.....	4.333,194	1,267,824	243,874
1897.....	3,954,866	1,332,511	102,205

About 50 per cent. of the traffic revenue is earned in the summer months and passenger revenue is about 54 per cent. of the total and freight business about 30 per cent. Transportation expenses absorb a relatively large proportion of the total (66.4 per cent. in 1899, but this was against 68.76 per cent. in 1897), this being accounted for not only by the large amount of passenger travel, but by the location of the company's lines, the problem being to provide a train service for 12 separate lines, each demanding express service.

The plans for the improvement of the property have been too extensive to be met entirely out of current earnings, and considerable charges to capital have been necessary, the amount in 1899 being $793,-959. The largest item outside of equipment was $136,502, to complete an incline connection in Brooklyn with the Brooklyn Elevated to provide a new route from Brooklyn Bridge to Jamaica, Rockaway, etc.

The financial affairs were placed in good shape during the year by taking up the floating debt (the bills payable and equipment notes, on June 30, 1898, were $1,730,000), and by taking up securities of leased lines and underlying liens, now represented in the balance sheet by a book value of $2,677,442, with an annual income to the company of $98,830. The means for all this was provided by the authorization of a unified 50-year mortgage for $45,000,000, under which $5,660,000 has so far been issued or authorized. The company now has no floating debt or equipment notes out.

The Interstate Commerce Commission is to have organized assistance in the movement, recommended in its annual reports for two or three years past, to secure legislation by Congress which will make it easier than at present to enforce the orders of the Commission in cases where it is decided that transportation rates ought to be reduced. The Secretaries of the National Millers' Association and the Winter Wheat Millers' Association have had a conference with the Commissioners at Washington, and these associations propose to enlist the aid of other commercial bodies throughout the country. The report of the conference says that the millers, having se-

cured from the Commission a decision reducing rates on export flour, naturally desire to have the decision enforced as soon as possible. Why not take the case to the United States District Court and try to get the Commission's order enforced under the present laws?

The uniformed employees of the Baltimore & Ohio are to have service stripes, that the public may know of their faithfulness and ability. A gold stripe will mean five years of service and a silver stripe two years. Some of the conductors, we are informed, will be entitled to from seven to nine gold stripes. The use of two colors and the use of a single stripe for two years will suggest to the reader the desirability in this matter of a uniform basis on different roads. There is already some variety in stripes, and one who sees a conductor with, say, four stripes on his sleeve is often in doubt whether the man has served four years or twenty, unless the rule of that particular company is known.

Master Car Painters' Convention.

The thirtieth annual convention of this Association was held at Philadelphia September 12, 13, 14 and 15. The number of members in attendance was 131. The Mayor of the city gave the Association an address of welcome, which was followed by President H. G. MacMasters (Ill. Cent.), with the annual address. The Secretary's annual report stated that the increase in membership during the past year had been 21, making the present membership 219. Officers elected for the ensuing year were: President, D. A. Little, P. RR., Altoona, Pa.; First Vice-President, A. J. Bruning (L. & N.); Second Vice-President, A. P. Lane (B. & M.); Secretary, Robert McKeon (Erie), Kent, O.

Of the subjects discussed, Terminal Cleaning of Passenger Cars was one of the most important. H. M. Butts (N. Y. C.) read a paper. He said that the cleaning of passenger equipment should be second in importance only to the painting. What is the general practice? The car leaves the shop bright and beautiful; it makes a trip and is turned over to those who are frequently inexperienced. It is given a dose of water (a rapid destroyer of varnish), is washed with a long-handled brush, the sand and grit are rubbed in and the car is left to dry in the sun. Varnish exposed to the destroying elements and the sun will soon perish. In place of water, use a cleaning material that will not only cleanse the surface from smoke and dirt, but will partially seal up the indentations. Cleaning should be divided into three classes: Class A consists of the ordinary sweeping and dusting and wiping windows with dry waste. Class B, dry wiping all over with waste saturated in some special cleaning material which removes rain streaks and spots; clean windows with fine pumice and muriatic acid diluted with water; trucks and platforms should be cleaned with oily waste and the inside with dry waste. Class C, give a thorough renovating inside and out every three months.

If it costs $120 per year for paint and varnish on a car, one-twelfth that amount, or $10, represents the cost per month. A car should be given Class C cleaning once in three months, at a cost of $4 ($16 per year). On a car thus kept in good condition there will be a saving of 40 per cent. in labor and material in refitting it for service when going through the shop.

Thos. Byrne (C. & O.), and F. J. Ridabaugh (P., Ft. W. & C.), presented papers which advocated the proper cleaning at terminals similar to Mr. Butts's paper. A resolution was passed that the use of an oil emulsion cleaner is the best for cleaning passenger equipment at terminals.

The painter has no choice in the selection of colors, as the management adopts the shade believed to be best for a trade-mark, but it was the prevailing sense of the meeting that a proper shade of the Pullman color was best, as it did not show the smoke and dirt so readily as Tuscan red or orange; but it should be decorated sufficiently to make it attractive. Cadmium yellow is a rich color, but very expensive to keep clean. One member, where this is in use, stated that their cleaning at terminals cost them $60,000 a year.

On the subject of cleaning and varnishing passenger equipment, R. J. Kelly (L. I.) presented a valuable report giving a new method of cleaning for varnish. He recommends an oil soap, a combination of linseed oil and alkali in a semi-paste form, practically a neutral soap.

The best method of removing paint from locomotive tanks was discussed. The sand blast is best, but few shops have sufficient air pressure to operate the sand blast machine. A pneumatic hammer has been used with good results. Some have steamed the tank and scraped the paint off while softened by the heat. For new iron or steel it is a good plan to clean the plates and prime them before being put in the tank.

Dr. J. N. Hurty, Secretary State Board of Health, Indianapolis, Ind., read a paper on the sanitation of passenger cars, which entered into the subject very thoroughly, showing the course which should be pursued in cleaning the inside of cars at terminal points and the proper disinfectants to be used. Ventilation was also discussed.

The next subject was: "Are We Making Any Progress in the Use of the Paint Sprayer?" F. S. Ball (P. RR.) said that the question should have read, "Is Progress Being Made by Inventors of Paint-Spraying Machines so as to Overcome the Objectionable Features of Those First Exploited?" The greatest success is claimed by those having a personal interest. The greatest success the past year has been claimed by shops whose output was comparatively small. A paper by C. B. Harwood (C. & O.) said that we are not making any progress with the sprayer, and gave the result of a test on 573 cars, which showed an increased cost of labor with the brush over the sprayer of $186.22, and the increased cost of material with the sprayer was $489.91, a difference of $303.69 in favor of the brush. There is one great trouble with the sprayer; it does not work at all times. The air becomes damp and there is difficulty in keeping up a uniform pressure, owing to the air being used for so many purposes around a shop. The general opinion of the convention was that but little progress was being made.

Discussing Subject No. 7, the decision of the convention was that it is not practicable to refill old painted cars that are badly cracked.

"Protective Coatings for Iron and Steel." A. P. Lane (B. & M.) had good results from a mixture of linseed oil and mineral brown. He had tested it with graphite on bridges. Pure graphite was undoubtedly good, but it is liable to be adulterated with silica, which has no wearing properties, although it is a good filler. The discussion was thorough, as this was an important subject, and it was the consensus of opinion that oxide of iron, graphite and carbon are the best pigments for painting on iron and steel.

Letters were read from the Master Mechanics' and the Master Car Builders' Associations naming subjects for the Master Painters to discuss at their next convention, which were referred to the Advisory Committee.

There was a general discussion of the queries on the list, bringing out valuable information. The daily sessions were well attended and good attention was given to the work of the convention. Resolutions of regret at the death of Cornelius Vanderbilt were passed.

The convention will meet at Detroit September 11, 1900.

TECHNICAL.

Manufacturing and Business.

The Ajax Metal Co. has issued a circular to railroad managers and motive power and mechanical officials, inviting them to use its space (Section M-13, main building) as a headquarters when visiting the National Export Exposition at Philadelphia. Ample facilities for correspondence have been provided.

B. F. Pillson, of Richmond, Va., for a number of years Southern representative of the Ajax Metal Co., of Philadelphia, has been made General Contracting Agent for the company, to take effect Oct. 1. Mr. Pillson, who is well known to the railroad trade, has succeeded in building up in the South a good business for the Ajax Metal Co., and the appointment is in recognition of his services.

The Westinghouse Electric & Manufacturing Co. has declared a quarterly dividend of 1¾ per cent. on its preferred stock, payable Oct. 2.

Directors of General Electric Co. have declared a regular quarterly dividend of 1½ per cent. on common stock, payable Oct. 14.

Harrison dust guards, made by the Harrison Dust Guard Co., Toledo, O., have been specified for use on the following equipment: Two thousand cars now being built for the Southern Ry.; 100 cars for the Flint & Pere Marquette RR., and 200 cars for the Detroit, Grand Rapids & Western.

The Chicago Pneumatic Tool Co., Chicago, Ill., has received an order for an air compressor, with receiver, and for a full outfit of pneumatic tools, for one of the shops of the Sanyo railroad of Japan. The order includes six Boyer piston air drills, five Boyer pneumatic hammers for chipping and caulking, three of the large 000 Boyer riveting hammers and two yoke riveters. Several previous orders from this railroad have been filled by the Chicago Pneumatic Tool Co.

Frank H. Clarke has been appointed Agent at Savannah, Ga., and E. M. Roberts, Agent at Cincinnati, O., for the Atlantic Brass Co. of New York City, makers of the A. B. C. journal bearing.

Iron and Steel.

Mr. M. B. Wittman, for 12 years with the E. & G. Brooke Iron Co. of Birdsboro, Pa., and of late manager of the blast furnace of that company, reports state, has become President of a new iron company in Danville, Pa.

Mr. Edgar C. Felton, President of the Pennsylvania Steel Co., and also President of the Harrisburg Traction Co., resigned the presidency of the latter company at a recent meeting of the Board of Directors, his resignation to take effect Oct. 1. Mr. Felton has been President of the company since 1895, and resigns to devote his entire time to the business of the Pennsylvania Steel Co.

The Pennsylvania Steel Co. increased its force at Steelton last week by 128 men.

It is said that a new company composed of Harry H. Light, Robert Mitchell, John F. Volger and others, of Lebanon, Pa., will soon be incorporated to operate the Hooven Mill at Norristown, Pa. This plant has been idle about six years.

The Iroquois Iron Co., of South Chicago, has bought 1,438 ft. of vacant land on the east side of Ave. M, running north from the Lake Shore & Michigan Southern Ry., and just east of the present plant of the iron company. The strip is 157 ft. deep and cost $30,365. It is said that this land will ultimately be used for an extension of the plant.

Expansion Allowance in Tunnels.

In the recent improvements of the San Fernando tunnel on the Southern Pacific the policy has been adopted of reducing the expansion allowance between the ends of the rails to a little less than one-eighth of an inch. The range of temperature is obviously very small and specially drilled angle plates have been applied. This tunnel, which is 22 miles north of Los Angeles, is 6,966 ft. long. The ballast has recently been renewed with screened gravel and 4-in. drain tiles each side of the track are used.

American Iron and Steel Wanted in Belgium.

United States Consul Le Bert, at Ghent, Belgium, writes the State Department that Mr. M. D. Levison, No. 58 rue Van Eyck, of that city, wants names and addresses of manufacturers of pig iron, Thomas; hematite and Spiegel; bar steel; blooms, Thomas and Bessemer. If prices are satisfactory, the transaction will be of considerable importance. Prices should be given c. i. f. at Antwerp, net cash.

A Decision in the Case of the Union Against the Hall.

A decision has just been rendered in the U. S. Circuit Court of Appeals in Philadelphia in the suit of the Union Switch & Signal Company against the Hall Signal Company and others. The decision is for the defendants (the Hall Company). It is held that four of the Union Switch & Signal Company's patents which are involved in the suit are not infringed and that the fifth patent is invalid. This litigation was begun April, 1894, and involved not only the Hall Company, but the Philadelphia & Reading Railroad and the Atlantic City Railroad as customers of the Hall Company. Suit was brought upon two patents of Oscar Gassett for railroad signaling circuits, one to George Westinghouse, Jr., for a signaling system, one to Gassett & Fisher for rail connectors and one to Means for rail connectors. The case was heard on appeal and the decision is that Gassett patents are not for broad or pioneer inventions, but that they are limited to special systems described, and that the Hall devices do not infringe. The Westinghouse patent is invalid by reason of prior publication in the Railroad Gazette and the prior use of the system on the Chicago, Burlington & Quincy. The Gassett and Means patents for rail connectors are also for narrow improvements and the Hall Company's connectors do not infringe. The case was argued on behalf of the Union Switch & Signal Company by Mr. George H. Christy, of Pittsburgh, and on behalf of the Hall Company by Messrs. W. H. Kenyon and Robert N. Kenyon, of New York.

THE SCRAP HEAP.

Notes.

The Seaboard Air Line and the Southern Railway have been indicted by the Grand Jury of Elbert County, Georgia, for allowing negroes and white people to ride in the same car.

Press despatches from Boston say that the proposed lease of the Boston & Albany to the New York Central will be made a political issue. The State Committee of the Democratic party proposes to insert in the platform at the annual convention a plank declaring that the lease is against public policy.

At Elizabethport, N. J., on the night of Sept. 13, a mob of freight handlers, yard brakemen and others employed by the Central of New Jersey partly wrecked the paymaster's car and threatened the paymaster with bodily injury. It is said that the men who committed the outrage claimed they had been wrongfully deprived of pay for overtime.

The Caledonian Railway of Scotland, in making a new agreement with some of its employees, shortening the hours of labor, stipulated that premiums to employees for taking precautions against accident should be abolished. It appears that such premiums have been common on a number of roads in Scotland. The North British and the Glasgow & Southwestern abolished the premiums some time ago.

The Saratoga Limited, the fast train between New York and Saratoga, which was put on by the New York Central and the Delaware & Hudson at the beginning of the past summer, is to be continued by the New York Central as the "Albany Flyer." The train will stop at Hudson, at Garrison and at six stations between, and to do this its time will be lengthened 15 minutes on the trip from Albany to New York in the forenoon and 20 minutes on the northward trip in the afternoon, making the time

through, 142 miles, three hours southbound and five minutes longer northbound. The Saturday train will continue to start at 1.50 p. m., one hour and 40 minutes earlier than the time on other days. It is said that the Saratoga train has proved very profitable.

An Important Chicago Street Improvement.

The ordinance for the extension of Ogden Ave. from Randolph St. northeast to Lincoln Park was passed by the Board of Local Improvements at a public meeting on Sept. 14, having been agreed to by the interested property owners. The City Council will be asked to approve the ordinance at once, and work which will cost over $2,000,000 will commence as soon as the necessary condemnation proceedings can be completed, which may take several months. This improvement will connect the North and West sides of the city, and it will be paid for by all the property benefited. To make the connection complete the city must build two bridges, the present cost of which would be very great on account of the value of the property affected. For the present this part of the work will not be undertaken.

Two-Cent Fare on the Chicago General Railway

The Chicago General Railway Co. on Sept. 7 instituted two-cent fares on its branch lines, selling 12 tickets for 25 cents. This company for several years up to 1897, sold six tickets for 25 cents, good on any of its lines, but at that time discontinued the rate, and has ever since been charging a five-cent fare on all its cars. The present reduction has been made as a means of increasing the business of the company. The two-cent ticket does not entitle the passenger to a transfer to the main line. The main line is on Twenty-second St., from Wabash Ave. west to Fortieth Ave., 5¼ miles. There are two branches—one leaving Twenty-second St. at Throop St. and running south on Throop and Morgan Sts., 2¼ miles to Thirty-ninth St. The other starts at Rockwell St. and runs south three miles on Lawndale St. to Thirty-sixth St.

American Pneumatic Tools Abroad.

Mr. E. N. Hurley, President of the Standard Pneumatic Tool Company, Chicago, returned from a trip to Europe a few days ago, having been absent six weeks. The most important transaction carried out was the organization of an English company, under the name of the International Pneumatic Tool Company, Limited, to make in England the full line of pneumatic tools and appliances made by the Standard Pneumatic Tool Company. The English company will build a factory at Chippenham, a London suburb, and is purchasing an outfit of American machinery. The capital of the company is £60,000, and it will have the exclusive right to manufacture and sell these tools and appliances in Great Britain, South America, Africa, India, China and Japan. Mr. J. P. O'Donnell promoted the company. The prospects for business may be inferred from the fact that before August 25 the new company had taken orders for 333 tools. While in Europe Mr. Hurley visited Germany and France, appointing agents in both countries and receiving orders for $96,000 worth of tools.

The National Export Exposition.

The National Export Exposition at Philadelphia opened Thursday, Sept. 14, and will remain open until Nov. 30. The Transportation Building is 450 ft. long and 100 ft. wide, and has exhibits of locomotives, railroad and street cars, car wheels and other railroad supplies, and there is to be an extensive showing of horseless carriages.

The Drainage Canal.

In the Circuit Court at Chicago, on Sept. 16, suit was brought against the Sanitary District of Chicago for breach of contract, and $500,000 damages, alleged to be due five contracting companies which have done the work of excavating the three miles of the canal within the Chicago city limits. The amount asked is said to cover claims for extras as well as the contracts proper. The plaintiffs are the McMahon & Montgomery Co., Green's Dredging Co., the Fitzsimons & Connell Co., the Chicago Dredging & Dock Co., and Hayes Bros., and it is probable that the court proceedings may delay the work of the Drainage Board.

What a Kind, Good Man.

Michael C. Murphy, President of the Board of Health of New York, has taken measures to prevent accidents on the elevated road and to see that the convenience of the general public is guarded during the Dewey celebration. He has sent this letter to the Sanitary Superintendent of the Health Department:—

You are directed to assign a sanitary officer to each of the various elevated railroad stations during the Dewey celebration to see that the rooms and the means of access and egress to the trains are kept open, that no crowding takes place, and that the community is protected.

You will also warn those who are supposed to have any knowledge of the unsafe condition of the pillars or the roadbeds of the elevated roads that if danger threatens they shall immediately communicate with the railroad authorities and stop the trains until a remedy can be applied. The utmost care must be exercised by your men to refrain from creating any alarm or infusing the belief into the minds of the traveling public that there is any danger.

Extension of an Ecuador Road.

Building is begun on the proposed extension of the Guayaquil & Quito, which is to run from Duram, a point opposite Guayaquil on the Guayas River, to Chimbo, a point at the foot of the Cordilleras, a distance of 65 miles, thence to Quito, the capital of the country, about 230 miles from Chimbo.

The Trans-Siberian Railroad.

Mr. Hagerman, Second Secretary of Embassy at St. Petersburg, sends to the United States Consular Department a translation from an article in a St. Petersburg paper giving late information about the Trans-Siberian Railroad. The traffic on the line completed between Tcheliabinsk and Irkutsk is so great that radical changes must be made in the line. It was built as economically as possible, with steep grades, light rails and a limited quantity of rolling stock. It is necessary to increase the weight of the rails, to renew the roadbed, to lengthen and increase the number of ties, to build sidings, and to change the wooden bridges to steel. On the western portion of the Great Siberian 29 new sidings have been built and 10 more are building. This will permit the running of 10 trains a day. The 50 wooden bridges are being replaced by iron. The steel bridge over the Yenisei, 2,800 ft. long and 420 ft. wide, is completed. On the Trans-Baikal nearly all the grading is completed and rails are laid for 366 miles from Strietensk, and 46 miles from Nuisoff, out of a total of 666 miles. It is expected that by June of next year this section will be in operation. Ten thousand workmen and convicts are at work at the Chinese section of the line, which it is expected will be completed in three years.

Some Amazing Information.

A Ministerial order has been issued in Russia ordering all railway companies to equip their freight rolling stock which runs in direct traffic with the Westinghouse quick-acting brake in four years from January, 1899. It is a very long step from this, however, to the deduction made by a palpable puffing writer in the Times, who says that "the Westinghouse brake, which has been adopted in so many countries, and which is well-nigh universal on the European, American and Australian continents, seems to be, so far, the only system which is practicable on long freight trains." The Westinghouse principle has been adopted in a good many countries, but it is by no means universal in any. In this country any brake fulfilling certain Board of Trade conditions can be used. Many experts believe that the vacuum principle when fully perfected will carry everything before it. In the United States the variety of brakes in use is legion, the Sweeney brake being about the best known, very particularly for heavy descending grades.—Herapath's Railway Journal.

Fast Run of the Empire State Express.

On Wednesday, Aug. 23, the Empire State Express, with the regular number of cars (four), having been delayed at Palatine Bridge, ran from Syracuse to Buffalo, 148.8 miles, in 140 minutes, making the regular stop at Rochester of about two minutes and stopping at East Buffalo on account of changes being made in the track at that point. The train left Syracuse at 2:37 P. M. and arrived in Buffalo at 4:57 (12 minutes late). The engine was No. 938; engineman, C. Edgerton; fireman, J. W. Kinney; rate of speed, including stops, 63.77 miles an hour.

A New Railroad in Guatemala.

A company, under the title of the Sociedad del Ferro Carril Nacional de Los Altos, has been formed in Quezaltenango, Guatemala, to build a railroad. The line is to run from San Felipe, which is about 1,800 ft. above the sea level, to connect by rail with the port of Champerico, some 6,200 ft. higher, and 27.2 miles from San Felipe. The first 8.2 miles, with a maximum grade of 3%, will be of the ordinary construction, but the last 19 miles will be of the R. Abt Cremellaire rack road system, with a maximum grade of 10%. The traction for the rack road will be electric, produced by water power from the River Sanala, which the road must cross near San Felipe. The road is to be three ft. gage, single track, with the necessary sidings. J. L. Bueron of Quezaltenango, Guatemala, is Engineer in charge.

The American Bridge Company.

Twenty-eight companies have given options for the proposed bridge and structural iron and steel consolidation, to be known as the American Bridge Co. They are:

A. & P. Roberts Co. (Pencoyd Iron Works), Philadelphia, Pa.; the Carnegie Company's Keystone Bridge Works, Pittsburgh, Pa.; Post & McCord, Brooklyn; J. B. & J. M. Cornell, New York; Elmira Bridge Co., Ltd., Elmira, N. Y.; American Bridge Works, Chicago; Union Bridge Co., Athens, Pa.; Edgemoor Bridge Works, Edgemoor, Del.; Lessig Bridge & Iron Works, Chicago; Berlin Iron Bridge Co., Berlin, Conn.; Shiffler Bridge Co., Pittsburgh, Pa.; Detroit Bridge & Iron Co., Detroit, Mich; Rochester Bridge & Iron Works, Rochester, N. Y.; Groton Bridge & Manufacturing Co., Groton, N. Y.; Youngstown Bridge Co., Youngstown, O.; J. G. Wagner & Co., Milwaukee, Wis.; Wrought Iron Bridge Co., Canton, O.; Toledo Bridge Co., Toledo, O.; Gillette & Herzog Manufacturing Co., Minneapolis, Minn.; Lafayette Bridge Co., Lafayette, Ind.; Pittsburgh Bridge Co., Pittsburgh, Pa.; Schultz Bridge & Iron Co., Pittsburgh, Pa.; Buffalo Bridge & Iron Works, Buffalo, N. Y.; Canton Bridge Co., Canton, O.; Bellefonte Bridge & Iron Co., Bellefonte, Pa.; Coke & Iron Works, St. Louis, Mo.; Hilton Bridge & Construction Co., Albany, N. Y., and Horseheads Bridge Co., Horseheads, N. Y. The following nine companies are also possible members of the consolidation: Champion Bridge Co., Wilmington, Del.; Chicago Bridge Co., Chicago, Ill.; Fort Pitt Bridge Co., Pittsburgh, Pa.; King Bridge Co., Cleveland, O.; Massillon Bridge Co., Massillon, O.; Phœnix Bridge Co., Phœnixville, Pa.; Penn Bridge Co., Beaver Falls, Pa.; Passaic Rolling Mills, Paterson, N. J.; Brockett Bridge Co., Pittsburgh, Pa.

The report of Stephen Little, who examined the books of the various concerns which are to form the new company, certified that the average annual earnings for a series of years were, in round figures, $2,997,000. And this, Mr. Little says in his report, after severe allowance has been made for deterioration of property. Each company will enter the combine on a value based upon the profits made during the past three years. The appraisals of the various plants were made by E. N. Eckert, of New York, and R. W. Hunt, of Chicago, Ill. The new company will be capitalized at $67,500,000, of which $27,000,000 is to be in 7 per cent. preferred stock and $40,500,000 common stock. Of this, $23,000,000 of preferred and $34,500,000 of common will be issued at present.

I. Gifford Ladd has been conducting the operations for the consolidation. Application for incorporation has not been made, nor have officers been decided upon.

LOCOMOTIVE BUILDING.

The Duluth & Iron Range is considering buying about 10 locomotives.

The Delaware & Hudson has ordered 10 engines from the Schenectady Locomotive Works.

The Grand Trunk has prepared specifications and is figuring on ordering a number of locomotives.

The Cleveland, Cincinnati, Chicago & St. Louis has increased its order with the Rhode Island Locomotive Works from four to 10 engines.

The 10 locomotives ordered by the Wheeling & Lake Erie from the Pittsburgh Locomotive and Car Works, and referred to Sept. 8, will be of the consolidation type, to weigh about 145,000 lbs., with 130,000 lbs. on the driving wheels. The principal dimensions are: Cylinders, 20 in. by 28 in.; driving wheels, 57 in. in diam.; boilers, Belpaire type, with 264 charcoal iron tubes 2 in. in diam. and 13 ft. 8 in. long; working steam pressure, 180 lbs.; fireboxes, 108 in. long and 40½ in. wide; tender capacity, 4,000 gals. of water and nine tons of coal.

The Chicago Great Western has ordered 10 compound 10-wheel locomotives from the Rhode Island Locomotive Works. They are for December delivery, will weigh 160,000 lbs., with about 120,000 lbs. on the driving wheels, and have 22 in. and 35 in. x 28 in. cylinders, extended wagon-top type boilers with 275 tubes, 2¼ in. in diam. and 15 ft. long, and a working steam pressure of 200 lbs.; fireboxes of Carbon steel, 112 in. long and 42 in. wide, and a tender capacity for 6,000 gals. of water and 10 tons of coal. The specifications call for Westinghouse air brakes, Coffin process toughened steel axles, Kewanee brake beams, Sargent special steel brake shoes, Tower couplers, Jerome piston and valve rod packings, Ashton safety valves, Leach sanding devices, Nathan lubricators and cast steel driving wheel centers.

On Sept. 8 we noted an order for seven consolidation locomotives placed by the Mexican Central with the Baldwin Locomotive Works. We are now officially informed that these will be simple engines with cylinders 21 in. x 26 in.; drivers, 55 in. in diam. over tires, and a total weight of 180,000 lbs., of which 160,000 will be on the drivers. The boilers will be of the Belpaire type, with working steam pressure of 180 lbs. and 374 charcoal iron tubes, 2 in. in diam. and 11 ft. $1\frac{5}{16}$ in. long. The fireboxes will be of steel, 120 ft. long, 69 in. wide at throat and 58 in. at back. The tank capacity for water will be 4,500 gals. and for coal eight tons. The special equipment will include Westinghouse air brakes, wrought iron axles, Player brake beams on tenders, cast iron brake shoes, cast steel couplers and wheel centers, Friedman injectors, made by the Nathan Mfg. Co., Nathan lubricators, soapstone piston and valve-rod packings, Scott springs, Crosby safety valves and steam gages and Johnstone blow-off cocks.

CAR BUILDING.

The Chicago & Northwestern is considering ordering about 40 cars for passenger service.

The Delaware, Lackawanna & Western has ordered five express cars from the Barney & Smith Car Co.

We are officially informed that the report that the Southern will order additional cars is not correct.

It is reported that the Pittsburgh & Lake Erie has ordered 500 steel cars from the Pressed Steel Car Co.

We are informed that the Northern Pacific is getting material for 250 cars, to be built at its own shops, but have no official information.

It is reported that the Minneapolis, St. Paul & Sault Ste. Marie is preparing specifications for 500 freight cars. We were unable to get official confirmation at time of going to press.

The 300 coal cars of 80,000 lbs. capacity, referred to in our issue of Sept. 8 as having been ordered from Pullman's Palace Car Co. by persons then unknown, are for the Cleveland, Lorain & Wheeling. The order has been increased to 500.

On Aug. 18 we noted an order for 100 flat cars let by the Mexican Central to the Illinois Car and Equipment Co., and on Sept. 8 an order from the same road for 100 box cars placed with the American Car and Foundry Co. All of these cars will be of 60,000 lbs. capacity, 34 ft. long over end sills and 8 ft. 9 in. wide over side sills and equipped with Player brake beams, Trojan couplers, Scott springs and M. C. standard draft rigging. The box cars will have Drake & Weir roofs.

In our issue of Sept. 8 we noted that the Canadian Pacific would build 400 box and 60 furniture cars at its own shops. These cars will all be of 60,000 lbs. capacity. The box cars will be 35 ft. long outside, 8 ft. 5 in. wide inside, 7 ft. 3 in. high inside and will weigh 31,000 lbs. The furniture cars will be 45 ft. long, 8 ft. 6 in. wide and 9 ft. high inside. All will have diamond trucks with steel bolsters, Common Sense body bolsters, steel axles, Westinghouse air brakes, Washburn couplers and Dunham doors. The box cars will have Monarch "solid" brake beams and Thornburgh draft rigging and the furniture cars will have Sterlingworth brake beams.

The 200 flat and 100 furniture cars ordered from the American Car and Foundry Co. by the Detroit, Grand Rapids & Western, and referred to in our issue of Sept. 8, are for October delivery. All the cars will have a capacity of 60,000 lbs., and the flat cars will measure 37 ft. long, 8 ft. 9 in. wide and 41 in. high; the furniture cars will measure 40 ft. long, 8 ft. 7¾ in. wide and 8 ft. 6¾ in. high, and have National Malleable Casting Co.'s door fastenings and Chicago roofs. The specifications for both classes of cars call for Pressed Steel Car Co.'s trucks, National hollow brake beams, Westinghouse air brakes, Fulton Iron and Engine Works' brasses, Gould couplers, Butler draft rigging, McCord journal boxes and journal box lids, Detroit springs, arch bar trucks and American Car and Foundry Co.'s axles and wheels.

The eight first-class and eight third-class passenger coaches which the Barney & Smith Car Co. is building for the Mexican Central, as noted in our issue of June 30, will be delivered in December, probably. They will be 60 ft. long over end sills, 9 ft. 8 in. wide over side sills and 14 ft. high from the rail. They will have wrought iron axles and plate bolsters, cast iron journal boxes and lids, brake shoes and special cast iron wheels and M. C. B. standard brasses, door locks and trucks. The first-class cars will have Pullman wide vestibules and six-wheel trucks and the third-class cars will have four-wheel trucks. The special equipment on all the cars will include Player brake beams, Westinghouse air brakes, National-Miller couplers, Baker heaters, Standard steel platforms, Scott springs, Pigria tin roofs and Barney & Smith curtain fixtures and Pantasote curtains in the first-class cars. It is not yet decided whether Pintsch gas or oil will be used for lighting.

BRIDGE BUILDING.

ATLANTA, GA.—The Collins Park & Belt. Ry. Co. offers $50,000 toward the new viaduct on Whitehall St., from Alabama to Marietta St. It is reported that the plans have been prepared for this structure. (See also Roswell.)

BATTLE CREEK, MICH.—A contract has been let to the Grand Rapids Bridge Co., of Grand Rapids, Mich., for a Melan Arch bridge of two 42-ft. spans in this city, at $10,925.

BINGHAMTON, N. Y.—Plans have been prepared for the proposed viaduct at Chenango St., over the D., L. & W. tracks. The estimated cost is $123,406. Address A. H. Sutemeiser, Engineer to the State Railroad Commissioners.

BLUE RIVER, WIS.—There will probably be a bridge built across the Wisconsin River at this place. Special elections have been held for bonding the various towns toward building. The town of Richwood offers $10,000.

BOSTON, MASS.—The Secretary of War has refused to grant permission for building the proposed Cove St. bridge.

CHICAGO, ILL.—The Street Department is investigating all the bridge approaches in the city and probably several will be closed to traffic. The Clark St. viaduct at Twelfth St. and the bridges at Western Ave., Ewing Ave., Ninety-fifth, Weed, and North Halsted St., and North and Ashland Aves., are reported dangerous. The Ninety-fifth St. bridge is still swung open, unsafe to use and a menace to navigation.

Two bridges will be needed on the proposed extension of Ogden Ave. to Lincoln Park.

CLAYTON, MO.—A bridge will probably be built across the Merrimac River at Votaw Ford. The County Court has ordered specifications prepared.

CLINTON, N. Y.—It is said that a bridge will be built over the canal on Cottage St. F. A. Gruman, Street Commissioner.

COLUMBIA, S. C.—About 200 ft. of trestling over the Broad River on the Columbia, Newberry & Laurens RR. fell with a train on Sept. 9.

COLUMBUS, O.—Proposals will be received by the Board of Public Works until Sept. 28 for raising and rebuilding the bridge over Dry Run, as per plans and specifications on file in the office of the Chief Engineer. Lynn W. Neereamer, Clerk.

COLUMBUS, TEX.—Bonds for $30,000 will soon be sold to build the proposed bridge across the Colorado River, which is 300 ft. wide at this place. (June 23, p. 459.)

DAVENPORT, IA.—The Wisconsin Bridge & Iron Co., of Milwaukee, has the contract for the bridges on the new line of the Davenport, Rock Island & Northwestern between Clinton and Davenport. Crossing the Wapsie River, there will be two spans of 110 ft. each, the others average about 80 ft. There are six bridges in all.

DAWSONVILLE, GA.—The Dawson County Commissioners propose to build a new bridge over the Etowah River.

DENVER, COL.—According to report, the Union Pacific will need several bridges on a new line in Weber Canyon.

DETROIT, MICH.—It will be decided next week whether bonds for $10,000 shall be issued for the purposed iron swing bridge over the Rogue River at Fort St., between Springwells and Encorse townships.

DUNKIRK, N. Y.—Sealed proposals are wanted by the Common Council for a bridge on a new street. W. C. Baumgartner, City Clerk.

FRANKLIN, PA.—Viewers are appointed to consider a site for a new bridge over French Creek.

GLENDIVE, MONT.—Bids will be received on Oct. 14 for the purchase of the material of the old iron bridge over the Yellowstone River and for its removal. The contract for the new structure has been let. James McCormick, County Clerk.

HARRISBURG, PA.—Foley & Richards of Philadelphia have a contract for a new 100-ft. stone arch bridge over Maiden Creek, for the Pennsylvania RR., the work to be finished within six months.

INDIANAPOLIS, IND.—Bids will be received Sept. 27, for building a Melan or stone bridge over Fall Creek, at Meridian St., and for a Melan, stone or plate girder bridge over Fall Creek, at Illinois St. Plans and specifications are on file in the office of B. J. T. Jeup, City Engineer. (Aug. 4, p. 558.)

The contract for building a Melan arch bridge of 32 ft. span, over Little Buch Creek, Marion County, was let to H. A. Mansfield of Indianapolis, at $1,695.

IRONSIDES, QUE.—Reports state that it is proposed to replace the wooden bridge over the Gatineau River by an iron structure to cost about $25,000.

IRVINGTON, IA.—The Kossuth County Board will receive bids until noon, Oct. 2, for a 100 ft. span steel bridge, with 16 ft. roadway, on iron piers, to be built one-half mile from the railroad station at this place. C. A. Tellier, County Engineer; M. P. Weaver, County Auditor, Algona.

JOHNSTOWN, PA.—The Woodvale overhead bridge on the Pennsylvania RR. has been closed. The railroad has been ordered to repair the structure. Lee Masterton, City Engineer. (Aug. 11, p. 573.)

JOLIET, ILL.—The City Council on Sept. 11 referred the matter of bridges over the Drainage Canal to a committee to report in one week. It was thought that the matter was settled between Mayor Mount and the Trustees of the Sanitary District, as noted last week, but this action means still more delay, and it is possible that the question will be taken into court by the Board.

KANSAS CITY, MO.—The Union Pacific and the Chicago, Rock Island & Pacific Railroads will build the proposed viaduct at Tenth St.

LEBANON, PA.—Plans for a steel bridge over the Philadelphia & Reading Ry., near Second St., are wanted. Address Geo. B. Hayes, City Engineer and Inspector.

MANSFIELD, O.—Richland County has sold $20,000 of bridge bonds for contemplated new structures. (July 28, p. 545.)

MERCED, CAL.—New bids are wanted for a drawbridge, with a trestle and span, across the San Joaquin River by the Commissioners of Stanislaus and Merced counties. The following bids were received Sept. 11: Darby Laydon, $25,780; Cotton Bros. & Co., $25,800; California Bridge & Construction Co., $26,940; Healy, Tibbitt & Co., $26,000; Tumelty & Sons, $25,200; Pacific Construction Co., $24,743.

The Stanislaus Board accepted the bid of the Pacific Construction Co., but the Merced Board rejected all. A. S. Dingley, Clerk, Stanislaus Co.

MIAMI, FLA.—A bridge is petitioned for across Maimi River from Avenue D. A committee has been appointed to consider the matter.

MILWAUKEE, WIS.—A resolution has been presented to the County Board declaring the necessity of a new viaduct on Grand Ave. (Aug. 25, p. 601.)

NATCHEZ, LA.—John F. Jenkins, Clerk of the Board of County Supervisors, will receive bids until Oct. 2 for $5,500 of bonds for a new bridge.

NATIONAL CITY, CAL.—Bide are wanted Oct. 2 for a bridge on National Ave., near Eighteenth St. O. W. Grant, City Clerk.

NORWOOD, O.—The Bracket Bridge Co. will build the superstructure of the new bridge over the Baltimore & Ohio Southwestern on Montgomery Pike. The bid was $11,000. (Jan. 6, p. 13.)

OAKES, N. D.—Bids are wanted Oct. 2 for a combination steel or wooden bridge of two spans over the James River. Dickey County. H. J. Oberman, County Auditor, Ellendale.

PEMBROKE, ONT.—Reports state that the Interprovincial bridge at Des Joachins recently collapsed and that a new bridge will be built at once.

PITTSBURGH, PA.—A bridge will probably be built across Haight's Run to connect Morningside with Megley Ave.

A span of 110 ft. will be built between Heath and Avondale Aves.

POMEROY, WASH.—Bids are wanted, according to report, for a 60 ft. bridge.

PORTAGE DU FORT, ONT.—Plans are being prepared by the Dominion Public Works Department for the proposed new steel bridge to be built in place of the wooden structure which collapsed in December.

QUEBEC, QUE.—A subsidy not to exceed $50,000 has been granted by the Dominion Government for a bridge across the St. Francis River.

The Great Northern Ry. has a subsidy of $16,425 for a bridge over the St. Maurice River. Other subsidies for bridges are $15,000 for a bridge across the Lac River; $15,000 for a bridge across the Riviere du Loup; $15,000 for a structure over the Nicolet River, and $33,750 for the Midland Ry. Co., Ltd., bridge across the Shubenacadie River.

READING, PA.—Proposals will be received at the County Commissioner's office until Oct. 2, 12 o'clock noon, for the steel superstructure for a bridge near Boyertown, in Colebrookdale Township, across the Swamp Creek. Chas. E. Staninger, Commissioner; Alfred Gunkel, Clerk.

Viewers have been appointed by the court for a new bridge over the Tulpehocken, on the road from Rehersburg to Krick's Mill.

REDDING, CAL.—The Supervisors received the following bids Sept. 7 for building a steel bridge across the Sacramento River at the mouth of Spring Creek: Thomson Bridge Co., $17,960; San Francisco Bridge Co., $18,984; E. Markwick, $19,172; Darby, Layden & Co., $19,644; California Bridge Co., $19,827.

Reports state that a suspension bridge is in contemplation by the county across the North Fork of Cottonwood Creek. A. J. Dryman, Clerk of Shasta County.

REDWOOD CITY, CAL.—New bids will be received until Oct. 2 for a bridge over Bear Gulch Creek near Woodside. The County Supervisors have plans and specifications for two new concrete bridges—one in Second Township and the other across a creek at Spanishtown. M. H. Thomson, County Clerk.

ROCKLAND, ME.—A steel bridge 160 ft. long and 18 ft. wide will be built across Blackington and Ulmer quarries, according to report.

ROSWELL, GA.—The Atlanta & Roswell Electric Ry. has a proposition before the County Commissioners of Cobb and Fulton counties for a bridge across the Chattahoochee River at Roswell for an extension from Atlanta.

RUNNELLS, IA.—Warren and Polk Counties are considering building a bridge over the Des Moines River at this place, at a probable cost of $10,000. James Laverty, Surveyor of Warren County, Indianola, Ia.

RUSTBURG, VA.—Bids are wanted for a county bridge over Falling River. Wm. H. Wingfield, Comr., Campbell Co.

SACRAMENTO, CAL.—The Board of Supervisors has endorsed the proposition for a bridge across the American River at Fair Oaks.

ST. PAUL, MINN.—Reports state plans have been prepared for a new bridge at Western Ave. The present structure has been condemned.

The Great Northern Ry., according to report, has prepared plans for a six-span plate girder bridge at Rice St. It will be 317 ft. long and 60 ft. wide. A three-span plate girder bridge is proposed at Snelling Ave.

SHARBOT LAKE, ONT.—Addington County, according to report, will make repairs to all bridges in the county. Address the Commissioner of Crown Lands at Toronto.

SHARPSBURG, PA.—Plans for the new Butler St. bridge over the Allegheny River for the Consolidated Traction Co. have been approved by the Secretary of War. It will be 1,830 ft. long and cost about $225,000. The Schultz Bridge & Iron Co. has the contract for the steel at $125,000.

SHELBY JUNCTION, O.—The B. & O. will build a through plate girder bridge of 66-ft. span at this place.

SHELTON, NEB.—The bridge committee of the Buffalo County Board has ordered a number of new bridges built where bridges were washed out in various parts of the county.

SOREL, QUE.—A subsidy of $35,000 is granted by the Canadian Government for a bridge over the Richelieu River at Sorel.

SPRINGFIELD, MASS.—The matter of rebuilding the St. James bridge across the New England RR. tracks is again before the County Commissioners. The Commissioners want the railroad to repair the present structure or build a new bridge.

TOLEDO, O.—The Jefferson Street Bridge Association has been organized to have a bridge built across the river from Jefferson to Oak St., near Second St.

VALDOSTA, GA.—The Commissioners of Lowndes County have ordered a bridge built over the Withlacoochee River, according to report. Another structure is in consideration.

WASHINGTON, IA.—Bids are wanted Sept. 28 for a bridge across the Iowa River at Holland's Ferry between Washington and Johnson counties. D. C. Kyle, County Surveyor; T. L. Crowley, County Auditor, Iowa City.

YAMASKI, QUE.—The Dominion Government has granted a subsidy of $50,000 to the South Shore Ry. to renew the railroad bridge over the Yamaski River.

Other Structures.

ATLANTIC CITY, N. J.—The Pennsylvania RR., according to report, will rebuild the station on South Carolina Ave.

ANNA, ILL.—Proposals will be received by L. Krughoff, President Board of Trustees, Illinois Southern Hospital for the Insane, Anna, Ill., up to 2 P. M. Oct. 3, for the following work on buildings to be known as Male Cottage and Storehouse: The masonry, cut stone, fire proofing, architectural iron, carpentry, sheet metal and tiling, lathing and plastering, painting and glazing, composition and plastic relief, and marble work.

BRIDGEPORT, CONN.—Bids for the new buildings for the Department of Police and Charities are wanted Oct. 7. Address Carroll B. Adams, Clerk.

BUTLER, PA.—The Davis-White Lead Co., capitalized at $400,000, will build a plant at this place.

CHICAGO, ILL.—A new armory will be built on the Lake front. Bids are wanted Sept. 27 by the Board of Commissioners, 707 Schiller Building, Chicago, for furnishing and driving the piles. Plans and specifications are on file in the office of the Board. E. R. Bliss, F. O. Lowden, W. S. Smith, Board.

CLEVELAND, O.—Messrs. Knox & Elliot, according to report, are preparing plans for a new theatre to be built on Euclid Ave., near Willson Ave., to cost about $150,000.

CLINTON, TENN.—Reports state that the John Weir Zinc Co., of London, Eng., will build new works at Clinton, Anderson County, Tenn.

COLLINS, N. Y.—Plans have been prepared for the addition to the Collins Homeopathic State Hospital for the Insane to cost $60,000.

COLUMBUS, GA.—The Columbus Manufacturing Co. will build a $250,000 cotton mill. F. B. Gordon, of Columbus, is President, and Chas. H. Utley, of Boston, Mass., Treasurer.

CRIPPLE CREEK, COL.—The Cripple Creek (electric) Ry. Co. will build a power station at Windy Point.

DETROIT, MICH.—The American Shipbuilding Co. will improve the Wyandotte yards of the Detroit Shipbuilding Co., at Detroit. A new dry dock 550 ft. long will be built which can hold any vessel now on the lakes. A Brown cantilever crane for hoisting steel plates will be installed, the crane to have two arms, so that hoisting may be done for two 500-ft. vessels at once. Pneumatic tools will be largely used, and a large air compressor has been ordered.

DE WITT, ARK.—Bids are asked until Sept. 25 for building an electric plant. The plant will have capacity for eight 1,200-candle power arc and 200 16-candle power incandescent lights. There will be required a boiler of 30 horse power, one dynamo of 250 lights of 16-candle power, one ten-light machine, 1,200 candle power each, and the necessary equipment. Address R. A. Houston, owner and Engineer, De Witt.

DIXON, ILL.—The Lee County Board of Supervisors have decided to build a new court house which will cost about $100,000. It will be on the site of the old structure.

DURHAM, N. C.—The Norfolk & Western has bought property in this place for a new passenger and freight station.

EASTON, PA.—The Sterlingworth Ry. Supply Co. will build a new rolling mill.

FAIRMOUNT, W. VA.—A new passenger station will be built at this place by the Baltimore & Ohio.

GLOUCESTER CITY, N. J.—The New York Ship Building Co. are having plans made for a $30,000 office building. Robert D. Hall of Boston, Mass., is the architect.

LE MARS, IA.—A new court house estimated to cost $17,000 will be built by Plymouth County.

LOUISVILLE, KY.—A new police station will be built on Shelby St., near Market St. A building permit has been issued.

MARTINEZ, CAL.—Contra Costa County proposes to build a new court house at an estimated cost of $100,000. F. L. Glass, County Clerk.

McKEES ROCKS, PA.—Reports state that the Pittsburgh & Lake Erie will build a refrigerating plant to cost, with other improvements in the freight yards, about $500,000.

MEMPHIS, TENN.—Plans for a business house to cost about $60,000 have been prepared by the architects, Messrs. Shaw & Shaw.

MILLEDGEVILLE, GA.—J. F. Wilson and others are interested in a project to build an electric power plant.

MINEOLA, N. Y.—Nassau County will build a new court house to cost about $125,000. Messrs. Wm. A. Boring, Wm. E. Stone and W. B. Bigelow, all of New York City, are engaged to advise the Board in the selection of plans.

MUSKEGON, MICH.—The Champion Iron & Steel Co. of this place, reports state, will build an eight-mill tin plate plant in addition to their bar mills. L. Friedman, Secretary and Treasurer.

NEW YORK, N. Y.—The New York Telephone Co. has filed plans at the Department of Buildings for a nine-story brick and stone office building, 24.11 x 115.4, at No. 14 Cortlandt St., to cost $100,000.

According to report, an eight-story fireproof office building will be built at Madison Ave. and Fifty-ninth St.

Plans have been filed with the Building Department for a six-story warehouse, to cost $24,000, at 466 Greenwich St., for Samuel Crooks. Mr. F. Baylies is the architect.

The St. Lawrence Realty Co. has filed plans for the 14-story office building at Broadway and Cedar Sts. It is estimated to cost $700,000. The architect is Mr. Bruce Price.

James H. Camac, of Trenton, N. J., proposes to build a seven-story apartment house at the northwest corner of Central Park West and Sixty-sixth St. The building will be 150 x 95 ft., and will cost, according to the estimate, $300,000. The architects are Messrs. Mulliken & Pruitt.

The Republican Club has taken preliminary steps for a new club house at Fifty-fifth St. and Fifth Ave. The cost is placed between $75,000 and $80,000.

The following bids were received Sept. 7 by the Department of Parks for the new southwest addition and lecture hall to the American Museum of Natural History: Thomas Cockerill & Son, $184,900; James B. Smith, $241,753; Thomas Dwyer, $229,200.

PADUCAH, KY.—The Paducah Brewing Co. is incorporated with $125,000 capital stock by F. C. Shoenthaler, Chicago, and W. F. Paxton and Geo. A. Dains, of Paducah. A plant will be built.

PENSACOLA, FLA.—The Louisville & Nashville RR., according to report, will build several warehouses and wharves at this place.

The Pensacola Electric Terminal Railway Co. will build a new power house.

PETERSBURG, VA.—Williams & Sons Co., according to report, will receive bids in October for a new ice factory.

PHILADELPHIA, PA.—Reports state that Messrs. Stearns & Castor, architects for four buildings for the Wolf Press Leather Co., will soon ask bids for building. The buildings will be near Frankford and each will be one story high, of steel, stone and brick, and to consist of a main factory building 396.9 ft. x 52.9 ft., with office attached; furnace and drying department, 202 x 147½ ft.; engine room 75 x 50 ft.; workshop and storage house, 50 x 182 ft. The total estimated cost is $100,000.

POTTSTOWN, PA.—The Pottstown Iron Co. proposes to raise $1,000,000 by increasing the capital stock, to rebuild the steel plant and the anvil blast furnaces. The stockholders must give their consent by Oct. 1, and the new issue of stock must be subscribed for by Feb. 1.

BEDFORD, IND.—The Southern Indiana Hotel Co. will build a new hotel at Indian Springs at a cost of about $225,000. The architect is Mr. J. A. Hawkins of Wilkesbarre, Pa.

ST. LOUIS, MO.—Reports state that the St. Louis Refrigerating & Cold Storage Co. is preparing plans for a new refrigerating plant.

SAN FRANCISCO, CAL.—The State Board of Harbor Commissioners has let the contract for building the car ferry slip at the foot of Bryant St., between Spear and Main Sts., to the City Street Improvement Co., at $30,890, the lowest bid of six received. (Aug. 18, p. 588.)

SANTA ANA, CAL.—Orange County proposes to build a new court house. W. A. Beckett, County Clerk.

STEELTON, PA.—Reports state that plans for the new machine shop of the Pennsylvania Steel Co. are about completed. It will be 500 x 160 ft., and will be between Nos. 1 and 2 blast furnaces. The present machine shop will be used by the bridge and construction department.

TOPEKA, KAN.—An auditorium to cost about $60,000 will be built by the city. J. H. Squires, City Clerk.

URBANA, ILL.—The Board of Supervisors of Champaign County Sept. 13 ordered that the Court House at Urbana be improved by putting a 40-ft. addition to the front of the present building, and adding a third story to the whole structure, at a cost not to exceed $50,000. The work will probably be done under the direction of a committee appointed by Chairman Bear, of the Board.

WHEELING, W. VA.—Reports state that the B. & O. will build a new passenger station at this place.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Atlanta & West Point.—Twenty-five per cent., payable Oct. 2.
Boston & Maine.—Quarterly, 1¾ per cent., payable Oct. 2.
Canadian Pacific.—Preferred, 2 per cent., payable Oct. 2.
Chesapeake & Ohio.—Quarterly, 1 per cent., payable Oct. 25.
Chicago & Alton.—Common, $2.25 per share, payable Oct. 2.
Chicago Junction.—Quarterly, preferred, 1½ per cent., payable Oct. 2.
Chicago, Milwaukee & St. Paul.—Preferred, 3½ per cent.; common 2½ per cent., payable Oct. 21.
Chicago, Rock Island & Pacific.—Quarterly, 1¼ per cent., payable Nov. 1.
Cleveland, Cincinnati, Chicago & St. Louis.—Quarterly, preferred, 1¼ per cent., payable Oct. 20.
Evansville & Terra Haute.—Preferred, 2 per cent., payable Oct. 16, common 2 per cent., payable Oct. 19.
Manhattan.—Quarterly, 1 per cent., payable Oct. 2.
New York Central & Hudson River.—Quarterly, 1 per cent., payable Oct. 16.
New York & Harlem.—Preferred, 2 per cent., payable Oct. 2, and $12.50 per share extra.
New York, New Haven & Hartford.—Quarterly, 2 per cent., payable Sept. 30.
Pittsburgh, Cincinnati, Chicago & St. Louis.—Semi-annual, preferred, 1½ per cent.
Pittsburgh, Youngstown & Ashtabula.—Preferred 3½ per cent.; common 3 per cent., payable Sept. 25.
Southern.—Preferred, 1 per cent., payable Oct. 4.
Southwest Pennsylvania.—Five per cent., payable in October.
Sunbury & Lewiston.—Semi-annual, 4 per cent., payable Oct. 2.
United N. J. RR. & Canal.—Quarterly, 2½ per cent., payable Oct. 10.
West Virginia Central & Pittsburgh.—One-half per cent., payable Oct. 7.

The Engineers' Club of Philadelphia.

A business meeting of the Club—the first Fall meeting—was held on Saturday, September 16, at 8 o'clock p. m. The paper was "A Portable Electrical Testing Set," by Wm. C. L. Eglin.

American Society of Railroad Superintendents.

We understand that there is to be no meeting of this society this month. A member of the Executive Committee informs us that the next meeting will be at the Holland House, New York City, on Oct. 10.

New York Railroad Club.

A regular meeting of the New York Railroad Club was held in the rooms of the Transportation Club, Hotel Manhattan, New York City, Thursday, Sept. 21. A paper on "Some Deductions from Road Tests of Locomotives" was presented by Mr. R. P. C. Sanderson.

Western Railway Club.

A meeting of the directors of the Western Railway Club was held in Chicago on the 12th. Mr. J. W. Taylor, now Secretary of the Master Car Builders' and Master Mechanics' Associations, was elected to serve as Secretary of that Club until the end of the Club year, namely, until next May.

St. Louis Railway Club.

A full free scholarship in Blees Military Academy for session 1899-1900, worth $350, has been put at the disposal of the St. Louis Railway Club. This means that all necessary expenses, except for uniforms and books, will be paid by the Academy for any boy sent by the club. The club has voted to furnish uniform and books to the successful applicant, thus making the scholarship absolutely free. The applicant must be the son of a member of the club, either active or associate, and be able to pass a competitive examination in the city of St. Louis, before October 1, 1899.

Association of Railway Superintendents of Bridges and Buildings.

The ninth annual convention of the Association will be held at the Hotel Cadillac, Detroit, Mich., Oct. 17 to 19. A business session will be held Tuesday morning, Oct. 17, and at the afternoon session the committee reports will be read and the reports presented at the last convention will be discussed. On Wednesday morning the reports of the "committees on subjects" will be discussed, which will be continued at the afternoon session, when there will also be discussions on questions proposed by the members. The miscellaneous business will be transacted on Thursday morning and on Thursday afternoon arrangements have been made for several trolley excursions, including a trip to Mt. Clemens and to the city water works. Information regarding rates, etc., may be obtained from the President of the Association, Mr. J. H. Cummin, Long Island City, N. Y.

Southern and Southwestern Railway Club.

At the quarterly meeting, held in August, the subjects discussed were "Paint for Railroad Coaches and Cars," and "Electric Lighting for Passenger Cars." The first topic was introduced by letters from several members. The latter was reported on by Messrs. W. E. Symons, Superintendent Motive Power, Plant System; R. H. Johnson, Master Mechanic, Atlanta & West Point, and P. S. Lloyd, Division Master Mechanic, Chesapeake & Ohio.

The next meeting will be held at the Kimball House, Atlanta, Ga., on Nov. 9. It will be the annual meeting and the election of officers will take place. Further, the following subjects will be taken up:

1. "Pneumatic Cleaning Plants for Passenger Equipment." Special Committee: Messrs. W. L. Tracy, P. Leeds, Jas. Cullen, R. E. Burgess, and R. H. Johnson.
2. "What Is the Best Type of Engine Truck-Brass and Best Methods of Fastening to Prevent Heating and Insure Good Service?" Special Committee: Messrs. J. T. Robinson, E. Burton, and M. T. Carson.
3. "To What Extent do Draft Appliances, Valves and Valve-Setting, and Cylinder Packing Influence Economy of Fuel?" Messrs. R. P. C. Sanderson, F. H. McGee, and W. H. Owens.

Astronomical and Astrophysical Society of America.

A National and permanent Society, with the above title, was formally organized at an astronomical conference, held at the Yerkes Observatory of the University of Chicago, at Lake Geneva, Sept. 6-8. This is the third annual meeting of the conference, the first, two years ago, having been held at Lake Geneva, and the second, last year, at Cambridge, Mass. The call for the third meeting was issued in February last, and about forty prominent astronomers and scientists were present. Papers by Profs. A. S. Flint, University of Wisconsin; William Harkness and S. I. Brown, Naval Observatory, Washington, D. C.; F. R. Moulton, E. E. Barnard and Kurt Laves, University of Chicago; E. C. Pickering and S. I. Bailey of Harvard University; W. W. Campbell and J. E. Keeler, Lick Observatory, and others, were read and discussed. The following officers were elected: President, Simon Newcomb, of Johns Hopkins University; Vice-Presidents, Charles A. Young, of Princeton College, and George E. Hale, of Yerkes Observatory; Secretary, George E. Comstock, Director of Washburn Observatory; Treasurer, C. L. Doolittle, University of Pennsylvania. Members of Council—For two years, Edward C. Pickering and J. F. Keeler; for one year, Edward W. Morley and Orland Stone. The Secretary is elected for three years, the other officers for one year. The delegates were entertained by a trip around the lake and by a reception given by Dr. and Mrs. Hale. The conference adjourned at noon, Sept. 8, to meet the last of June, 1900, in New York, in connection with the American Association for the Advancement of Science. Abstracts of all papers read at this conference will be published as soon as possible.

Western Society of Engineers.

On Tuesday, Sept. 12, about 140 members of the Society, ladies and guests, visited the Yerkes Observatory of the University of Chicago by invitation of Dr. W. H. Harper, President of the University. Through the courtesy of the Chicago & Northwestern Ry. a special train of a smoking car and three parlor cars, furnished by that road, left Chicago at 9 A. M., arriving at Williams Bay, Lake Geneva, at 11 A. M. Steamers chartered by the Entertainment Committee were in waiting, and took the party to the hotels for dinner, and for a trip around the lake, after which a trolley ride was taken over the Harvard & Geneva Electric Ry., through the courtesy of that road, which furnished special cars for the trip, a stop being made at the power house of the road. From 2 to 5.30 P. M., the party was received at the Yerkes Observatory by the Director, Dr. George E. Hale, Prof. E. E. Barnard and other members of the staff of professors and instructors. The Observatory is a large and handsome stone building, standing on a hill at the east end of the lake, of which a fine view is obtained from the dome. Among the principal objects of interest at the Observatory are the 40-in. telescope, located in the large tower and operated by electric motors. The sight end of the instrument is accessible by means of an elevating floor which can be raised or lowered through 23 ft. In the north tower is a 12-in. equatorial telescope, and a 24-in. reflecting telescope is under construction in the south tower. A concave mirror 5 ft. in diameter for a powerful reflecting telescope is being made in the optical laboratory, and in one of the physical laboratories a machine for ruling optical gratings, containing 13,000 lines per inch is being made. After the visit to the Observatory, supper was served at two hotels and after a reception the party returned to Williams Bay by boat, and leaving there by train at 8.30 reached Chicago at 10.30 P. M. The excursion was one of the most delightful ever taken by the Society, and it was arranged by the Entertainment Committee, consisting of Messrs. G. P. Nichols, J. W. Dickinson, E. M. Hagar and T. L. Condron.

The Franklin Institute.

The celebration of the seventy-fifth anniversary of the Institute should properly have taken place on February 5, 1899. In accordance with the decision to have the celebration at the time of the National Export Exposition, it has been arranged to hold in the auditorium of the Exposition in Philadelphia during the week beginning Monday, October 2, a series of special anniversary meetings under the direction of the several sections of the Institute, each evening at 8 o'clock, and to be concluded by a special meeting of the Institute. At these meetings it has been arranged that addresses appropriate to the occasion shall be delivered by distinguished invited guests and members of the Institute. The series of meetings and addresses thus far arranged is as follows:

Monday, October 2. Chemical Section.—Dr. Joseph W. Richards, Bethlehem, Pa., President of the section. "Introductory Address." Prof. Harvey W. Wiley, Washington, D. C. "The Progress of Chemistry as Applied to the Arts." Dr. Charles F. Himes, Carlisle, Pa. "Photography and Microscopy in their Applications to the Arts" (Photographic and Microscopic branch.)

Tuesday, October 3. Electrical Section.—Dr. Edwin J. Houston, Philadelphia, Pa. "A Summary of Electrical Progress During the Past Seventy-five Years." Mr. Ralph W. Pope, New York. "The Influence of such Societies as the Franklin Institute and the American Institute of Electrical Engineers in Promoting the Progress of the Electrical Arts." Prof. F. B. Crocker, New York. "The Commercial Aspects of American Electrical Industries."

Wednesday, October 4. Mining and Metallurgical Section.—Mr. James Christie, Philadelphia, Pa., President of the section. "Introductory Address." Mr. Chas. Kirchhoff, New York. "Three-quarters of a Century's Progress in Mining and Metallurgy." Mr. John Fritz, Bethlehem, Pa. "Personal Reminiscences."

Thursday, October 5. Mechanical and Engineering Section.—Mr. Wilfred Lewis, Philadelphia, Pa., President of the section. "Introductory Address." Dr. Coleman Sellers, Philadelphia, Pa. "The Progress of the Mechanical Arts in Three-quarters of a Century."

Friday, October 6. Physical and Astronomical Section.—Dr. A. E. Kennelly, Philadelphia, Pa., President of the section. "Introductory Address." Dr. T. C. Mendenhall, Worcester, Mass. "The Progress of Physics and Astronomy."

Saturday, October 7. "Institute Day."—Mr. John Birkinbine, Philadelphia, Pa., President of the Institute. "Introductory Address." Dr. Robert H. Thurston, Ithaca, N. Y. "The Evolution of Technical Education and its Progress during the Past Seventy-five Years." Rear-Admiral Geo. W. Melville, Engineer-in-Chief, U. S. N. "The Modern Warship as Combining in Itself the Highest Results of Skill, Ingenuity and Scientific Knowledge."

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. Chas. E. Stevens, Treasurer of the Boston & Albany, died at Hingham, Mass., Sept. 14, aged 66 years.

—Mr. Harry Pollitt, Chief Locomotive and Marine Engineer of the Great Central Railway of England, arrived in New York last Sunday and will be in the country for two or three weeks. He comes over particularly to look after the order for 20 freight engines which he has placed with the Baldwins.

—Mr. D. B. Robinson, President of the St. Louis & San Francisco Railroad, is said to be seriously ill in Chicago. His son is reported as saying that his condition is not particularly dangerous and that he hopes he will be able to be moved within two or three days. Mr. Robinson is about 52 years old and has been in railroad service for 33 years, all of that time in the transportation department. He is one of the most widely known operating officers in the country.

—Mr. Charles Alfred Pillsbury, a pioneer in modern milling, and head of the Pillsbury-Washburn Co., of Minneapolis, Minn., died at his home in that city Sept. 17, at 5 P. M. Mr. Pillsbury was born in Warner, N. H., Oct. 3, 1842, and graduated from Dartmouth College in 1863. His family is of English descent, having settled in Boston, Mass., in 1640. In

1869 he went to Minneapolis and bought an interest in a small milling business of which he soon bought the whole. The venture was the beginning of his great business. Mr. Pillsbury became largely interested in the grain carrying railroads of the Northwest and that section of the country is much indebted to him for its rapid development. Mr. Pillsbury adopted a system of profit sharing with his employees, under which, after setting aside every year a certain sum for repairs and improvements and for fixed charges, the balance available for dividends was not all used for dividends, but was partly distributed among the employees. Mr. Pillsbury gave largely and very quietly to many charities, and his strong character and simple upright life won him many friends. His widow, and two sons now at the University of Minnesota, survive him.

—Concerning the reported resignation of Mr. C. P. Clark, President of the New York, New Haven & Hartford Railroad, we have official information that Mr. Clark has not resigned, but that he has notified the directors that he feels physically unable to continue permanently in the office and awaits their pleasure pending his relief.

Mr. Clark was born in Nashua, N. H., Aug. 11, 1836, being a son of Peter and Susan Clark. He is descended on his father's side directly from Hugh Clark, an Englishman who came to New England early in the eighteenth century and settled in New Hampshire. On his mother's side he is descended from an old Maine family. His father, Peter Clark, was graduated at Dartmouth in 1829 and studied law at Yale and became a prominent citizen of Nashua. Mr. Charles Peter Clark, the President of the New York, New Haven & Hartford, graduated at Dartmouth in 1856. He then went to sea and in the second year of the Civil War entered the U. S. Navy as Acting Ensign. He served until December, 1865, when he was honorably mustered out. He came to be volunteer Lieut. Commander, and during his service commanded the ironclads Carondelet and Benton, of the Mississippi River squadron. In 1870 he began his railroad career as clerk of the Board of Receivers of the Boston, Hartford & Erie. In 1873, in the course of the changes in the property, he became General Manager of the New York & New England and ultimately became President of that railroad, having retained unbroken connection with it. He became Second Vice-President of the New York, New Haven & Hartford in 1881 and President in 1887. His work there is a matter of recent and well-known history, including the absorption of the Boston & Providence and of the Old Colony System, the building of the new Boston terminals, the great and costly improvements of the western end of the line and in brief the thorough preparation of this property to serve adequately the great cities at its ends and the rich and populous country through which it passes. Mr. Clark is a man of high administrative ability, being very quick and prompt and holding his subordinates up to strict responsibilities. In 1857 he married Miss Caroline Tyler and has six children living, two sons and four daughters. The elder son, Charles Peter Clark, is now General Superintendent of the Eastern District of the New York, New Haven & Hartford Railroad. The other son is also connected with the railroad, having graduated from college within three or four years.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—F. C. Maegly has been appointed Assistant General Freight Agent, succeeding C. R. Hudson, resigned.

Atlanta & West Point.—H. Walters has been elected a Director, succeeding Thos. K. Scott.

Buffalo, Rochester & Pittsburgh.—J. M. Floesch has been appointed Superintendent of the Pittsburgh Division (Punxsutawney to Allegheny and New Castle, via Butler Junction), with headquarters at Butler, Pa. The Divisions of this company are: Buffalo Division (Buffalo to Branford), Rochester Division (Rochester to Ashford), Middle Division (Bradford to Punxsutawney), Clearfield Division (C. & M. Junction to Clearfield), and the Pittsburgh Division, given above.

Canada Atlantic.—This company has secured control of the Pembroke Southern and the jurisdiction of the officers of the C. A., has been extended over the P. S. (See RR. News column.)

Canadian Pacific.—G. J. Bury, heretofore Division Superintendent at North Bay, Ont., has been appointed Superintendent at Ft. William, Ont., succeeding J. G. Cameron. T. J. Kennedy, heretofore Division Superintendent at Chapleau, Ont., has been appointed Division Superintendent at North Bay, Ont., succeeding Mr. Bury. C. Murphy has been appointed Acting Superintendent in charge of the Chapleau and White River sections, with headquarters at Chapleau, Ont.

Chicago Great Western.—W. H. Knowlton has been appointed Assistant Chief Engineer, a position recently created.

Chicago, Milwaukee & St. Paul.—D. C. Jones has been appointed Division Freight and Passenger Agent in charge of Chicago & Council Bluffs Division (in Iowa), Hale to Chautauqua, inclusive, Langworthy to Paralta, inclusive, and the Kansas City Division, Cedar Rapids to Thornton, inclusive, succeeding W. L. Kennelly, resigned. Effective Sept. 15.

Chicago, St. Paul, Minneapolis & Omaha.—Thomas Burns, heretofore Foreman at E. St. Paul, Minn., has been appointed Assistant Master Mechanic, with headquarters at Sioux City, Ia., succeeding J. K. Brassill, resigned. E. E. Machovec has been appointed Foreman at E. St. Paul, Minn., succeeding Mr. Burns, and Frederick Naylor has been appointed Foreman at St. James, Minn., succeeding Mr. Machovec. S. G. Strickland has been appointed Assistant Superintendent, with headquarters at St. James, Minn., succeeding W. C. Winter, transferred.

Cleveland, Cincinnati, Chicago & St. Louis.—J. C. Nelson, Engineer Maintenance of Way at Springfield, O., has resigned. L. S. Rose, Supervisor of Track, has been mentioned as the probable successor to Mr. Nelson.

Commerce Despatch Line.—The operation of this line since Sept. 15 is in charge of L. C. Haynes, General Manager, and E. H. Durrach, Car Service Manager, with headquarters at 1639-1641 Monadnock Building, Chicago, Ill.

Delaware, Lackawanna & Western.—W. A. Fleming, heretofore Western Freight Manager, with headquarters at Buffalo, N. Y., has been appointed General Eastern Freight Agent, with headquarters at New York, succeeding C. L. Hackstaff, resigned. Effective Sept. 15.

Detroit & Mackinac.—P. Richardson has been appointed Trainmaster, succeeding P. T. Hackett, resigned.

Eastern Ry. of Minnesota.—E. L. Gilboy has been appointed Trainmaster, with headquarters at West Superior, Wis.

El Paso & Northeastern.—R. L. Stewart has been appointed Master Mechanic, with headquarters at Alamogordo, N. M.

Evansville & Terre Haute.—W. H. Tilford having resigned as Chairman of the Board and as a Director. J. Hone has been elected Chairman of the Board.

Great Northern.—L. B. Allen has been appointed Superintendent of the Willmar Division, with headquarters at Willmar, Minn., succeeding Frank Shesgreen, deceased. R. C. Morgan has been appointed Assistant Superintendent of the Dakota Division, with headquarters at Larimore, N. D., succeeding F. A. Brainerd, transferred. Effective Sept. 12.

Michigan Central.—B. E. Hand, Assistant General Freight Agent, with headquarters at Chicago, Ill., has resigned.

Nashville, Chattanooga & St. Louis.—L. K. Wenning, Auditor of Receipts, with headquarters at Nashville, Tenn., has resigned.

At a meeting of the stockholders T. W. Edwards was elected a Director, succeeding E. W. Cole, deceased.

New York & Harlem RR.—W. K. Vanderbilt has been elected President, succeeding Cornelius Vanderbilt, deceased. H. Mck. Twombly has been elected a Director.

New York Central & Hudson River.—William Rockefeller has been elected a Director, succeeding Cornelius Vanderbilt, deceased.

J. C. Nelson, heretofore Engineer Maintenance of Way of the Cleveland, Cincinnati, Chicago & St. Louis, has been appointed Division Engineer of the Eastern Division, succeeding A. T. Hardin, who has been appointed Engineer of Track.

Oregon Railroad & Navigation.—F. V. S. Crosby has been elected Treasurer and A. Miller Assistant Secretary.

Rutland-Canadian.—T. Dickinson, formerly Locomotive Engineer on the West Shore, has been appointed Master Mechanic during construction of this line, a part of the Rutland. (See RR. Construction column, June 23, p. 461.)

Somerset.—W. T. Haines and J. M. Robbins have been elected Directors, succeeding A. J. Libby and E. F. Webb, deceased.

Texarkana & Ft. Smith.—Frank Cain, Master Mechanic, with headquarters at Texarkana, Tex., has resigned.

Tifton, Thomasville & Gulf.—Walter H. Harrison has been appointed Chief Engineer, succeeding E. Wilson, who has been appointed Resident Engineer.

United Counties.—A. Ouellette has been appointed General Traffic Manager, with headquarters at St. Hyacinthe, Que., succeeding H. Upton, resigned.

Virginia & Southwestern.—E. W. Mills has been appointed Auditor, with headquarters at Bristol, Tenn., succeeding D. H. Miller, resigned. Effective Sept. 11.

Wheeling & Lake Erie.—At a meeting of the stockholders, held Sept. 16, Myron T. Herrick was elected Chairman of the Board and James Parmelee Treasurer. At the same meeting J. C. Brown, G. Coppell, W. F. Conner, M. T. Herrick, G. A. Garretson and H. P. McIntosh were elected Directors.

White Pass & Yukon.—W. B. King, formerly Traveling Auditor of the Great Northern, has been appointed Assistant Auditor of the W. P. & Y., succeeding S. M. Irwin.

RAILROAD CONSTRUCTION.
New Incorporations, Surveys Etc.

ALASKA ROADS.—Alfred Day is reported at Seattle, Wash., representing a Philadelphia syndicate to build a railroad 15 miles long to develop coal lands of Kachkemo Bay, Cook Inlet.

ALGOMA CENTRAL.—A. E. Dyment, M. P. for Algoma, reports that building is begun on this line in which he is interested, from Sault Ste Marie, north 160 miles to Missanabie, on the main line of the C. P. RR., and thence to Lake Superior. A subsidy was obtained during the last session of Parliament. Five hundred men are at work. The company expects to have rails laid for 12 miles from Michipocoten Harbor on Lake Superior, to the iron mines owned by the company, by Nov. 1. (Aug. 25, p. 603.)

ARIZONA & UTAH.—Grading is to be begun about Oct. 1 on the section from Chloride, Ariz., northwest about 32 miles to White Hills. It was completed from McConnico Junction, Ariz., north 22 miles to Chloride in July. S. B. McConnico of Kingman is General Manager. (May 19, p. 359.)

ARIZONA ROADS.—The Detroit Copper Co., according to report, will ask for bids soon for its proposed narrow gage line from Morenci to connect with the Arizona & New Mexico line at Guthrie, 20 miles. (June 16, p. 439.)

The Helvetia Copper Co. of Tucson, Ariz., has decided to build a narrow gage track from Tucson, on the Southern Pacific, to its Santa Rita mining smelter. Track and supplies are already bought and no contracts for building are to be let. F. B. Close of Tucson is Chief Engineer. (Sept. 1, p. 619.) Wm. A. Paine of Boston is President. (Official.)

ATLANTA BELT.—Application is to be made in Georgia for a charter for this company, with a capital of $500,000, to build a belt line, not to exceed 30 miles long, completely encircling the city of Atlanta. It is to pass through Howell and Clifton stations. The incorporators are: Henry B. Tompkins, Walter H. Harrison, G. W. McCarthy, J. W. Pope, S. T. Wyman, W. M. Kelly, H. L. McKee, Clark Howell, Joseph Thompson, Robert C. Alston.

ATLANTIC COAST LINE.—The extension from Denmark, S. C., northwest 34.7 miles to Robbins is nearly completed. Abercrombie & Williams of Montgomery, Ala., are the general contractors. (Dec. 16, 1898, p. 903.)

BEAVER VALLEY.—The Council of Beaver, Pa., has granted right of way in that city for this proposed line, about four miles long from the Pittsburgh & Lake Erie to the Ohio River. J. M. Pew and W. S. Miller of Pittsburgh, Pa., are directors. The company was incorporated Sept. 5. (Sept. 8, p. 633.)

BELLINGHAM BAY & EASTERN.—J. G. Fairfowl of Everett, Wash., has the contract for clearing and grading the extension from Whatcom, Wash., toward the Blue Canyon coal mine. Work is to be begun at once and completed within three months. (Sept. 15, p. 549.)

BOSTON & MAINE.—The Directors of the Concord & Montreal have accepted the route of the Manchester & Milford extension from Manchester, N. H., southwest about 10 miles, via Bedford Center and Amherst, to Milford, on the Fitchburg. Grading is to be begun at once. (Sept. 1, p. 619.)

An officer writes that surveys are still in progress for double tracking the line to Portsmouth, N. H., between Salisbury, Mass., and Greenland, N. H. (Sept. 15, p. 649.)

CANADIAN NORTHERN.—J. MacMartin has completed the contract for grading his section of the Bedlington & Nelson line, which is the British Columbia end of the extension from Bonner's Ferry, Ida., north 52 miles to Kootenay Lake, B. C. Rails are to be laid at once. (Sept. 8, p. 633.)

CANADIAN PACIFIC.—The company is preparing to build from the St. Lawrence & Ottawa track south of the White bridge, to connect with the New York & Ottawa.

Three hundred men are at work extending the yard sidings for about four miles, extending the coal docks and building a new freight house at Fort William, Ont.

Surveys are to be begun soon for a spur from a point on Brown's Creek, the north fork of Kettle River, B. C., to run to Pathfinder Mountain, on the east side of the river. The Pathfinder mine is a shipping basis for ore and a number of promising mining properties in the vicinity are to be developed.

George H. Shaw, Assistant General Western Freight Agent, returning from a business trip from British Columbia, reports that the Columbia & Western extension will be completed into Grand Forks during this month. (Sept. 1, p. 619.)

The branch from Cranbrook into the North Star mines, 30 miles, is being built under Engineer Macleod. (Aug. 25, p. 603.)

CAROLINA & NORTHWESTERN.—This property has been sold to New York and Chicago men who propose to standard gage it and extend it at their end. (Aug. 4, p. 562.) Preliminaries have not yet been completed, but surveyors will be put in the field at an early date. The proposed extensions are from Lenoir, N. C., northwest about 50 miles to Elizabethton, Tenn., and thence to Bristol; also from Chester, S. C., southeast about 50 miles to Camden, on the South Carolina & Georgia line of the Southern. The present owners of the property have no connection with the Southern or Seaboard Air Line systems. (Official.)

CENTRAL NEW ENGLAND.—The extension from Tariffville, Conn., northeast 14.35 miles to Springfield, Mass., is to be completed about Dec. 1. The bridge over the Agawan is finished. The difficulty over right of way at Granby is reported settled. Ryan & Kelley, 8 South Broad St., Philadelphia, have the contract. (April 7, p. 252.)

CENTRAL OF GEORGIA.—Grading is rapidly nearing completion on the Searight Branch extension from Searight, Ala., southwest 18 miles, via Christine, to Andalusia. Hardaway, Jones & Co. have the contract. (April 21, p. 288.)

CHESAPEAKE & OHIO.—The company has under contemplation building a switching track along Carey St. in Richmond, Va. (Sept. 8, p. 633), but the matter has not yet reached the point when work can be proceeded with. (Official.)

Advertisements are out for 1,000 men to work on the Greenbrier extension up Greenbrier River, through Washington, W. Va., to White Sulphur Springs. (Aug. 25, p. 603.)

CHICAGO & EASTERN ILLINOIS.—About 10 miles of track is reported laid on the Eastern Illinois & Missouri extension from Marion, Ind., southwest 62 miles to Thebes, on the St. Louis Southwestern. The steel bridge across Saline Creek is now building.

CHICAGO, MILWAUKEE & ST. PAUL.—Extensive improvements are being made at the freight yards between Hanson Park and Gragin, near Chicago.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Land has been bought at Louisville, Ky., according to report, for an extension of the company's switching yards.

COLORADO SPRINGS & CRIPPLE CREEK.—Surveys have been completed, according to report, for this steam line from Colorado Springs, Colo., west 34 miles to Grassy, to connect with the Cripple Creek District Electric line for Cripple Creek and mining points. The maximum grade is 3½%; the maximum curve 16°. A large amount of trestle work will be required and several deep cuts and tunnels are to be built. E. W. Giddings, Jr., of Colorado Springs, Colo., is an incorporator. (July 14, p. 515.)

CONCORD & ROCHESTER.—Gustavus Walker of Concord, N. H., is reviving the project of this company, which was chartered some years ago. The proposed route is from Concord east about 40 miles, via Chichester, Loudon, Pittsfield and Northwood to Rochester.

COPPER RANGE.—In order to complete the line this season, the company, according to report, will double its present force of a thousand men. The line is projected from Houghton, Mich., southwest 56 miles to Rockland, on the Chicago, Milwaukee & St. Paul. C. E. Loss & Co. have the contract.

Thomas Appleton of Houghton, Mich., is Chief Engineer. (April 28, p. 305.)

DALLAS, FORT WORTH & GULF.—President Connor is reported as saying that the contract is to be let next month for the extension from Dallas, Tex., west 31 miles to Fort Worth. This line is successor to the Dallas Terminal & Union Depot. (Sept. 8, p. 633.)

DULUTH, SOUTH SHORE & ATLANTIC.—Grading is reported begun on the extension from Newtonville, below Houghton, to run southwest about 65 miles to Greenland. M. J. Peppard of Minneapolis has the contract. (Sept. 8, p. 633.)

EL PASO & NORTHEASTERN.—A new station has been established at Walnut, N. M., 152.7 miles from the coal fields, which are to form the proposed terminal. (Sept. 15, p. 649.)

ERIE.—M. Spellacey has the contract for building the second track between Kent and Tallmadge, O. (Sept. 15, p. 649.)

The Drake & Stratton Co. have the contract for the building of the second track from Galion to Ontario, O. The building of this track involves also the reduction of the grades from a maximum of 54 ft. per mile to a uniform grade of 35 ft. (April 4, p. 561.)

GEORGIA NORTHERN.—Sealed proposals for grading about six miles for the extension from Doerun, Ga., northwest 22 miles to Albany, will be received at Moultrie, Ga., until Sept. 30. The earthwork aggregates about 45,000 cu. yds. Profile and specifications may be obtained from the Chief Engineer, D. L. Wardroper, 503 Gould Building, Atlanta. (March 10, p. 179.)

GILA VALLEY, GLOBE & NORTHERN.—Surveys are to be begun soon, according to report, for an extension of the main line west about 18 miles to Pinto Creek, Ariz.

HOCKING VALLEY.—Surveys are reported in progress for an extension from Gallopolis, O., southeast about 35 miles along the south bank of the Kanawha River to Scary, W. Va., to connect with the Chesapeake & Ohio. Another proposed route is from Gallopolis south about 35 miles along the Ohio River to Huntington, W. Va. A bridge will be required across the Ohio.

ILLINOIS CENTRAL.—An officer writes that the company has no intention of extending its line, as widely rumored, from Madison, Wis., to Fond du Lac. (Sept. 15, p. 649.)

KENTUCKY WESTERN.—This company has been incorporated in Kentucky to build the line already noted under this title from Dixon, Ky., to Blackford, on the Illinois Central, about 17 miles. The incorporators are: Morton Thayer of Kansas City, and I. H. Wheatcraft, F. A. Seifert of St. Louis and F. M. Pease of Chicago. The Southern Construction Co. of St. Louis has the contract. (Sept. 15, p. 650.)

MANITOBA & NORTHWESTERN.—Rapid progress is being made in connecting the tracks of this company with those of the Great Northwest Central at Rapid City, Man.

MILLERSBURG.—This company was incorporated in Pennsylvania Sept. 13, with a capital stock of $20,000, to build a railroad, two miles long, from Anita, in Jefferson County, to mineral lands on the northeast branch of Elk Run. Others interested are: B. H. Taylor, George W. Young, C. D. Sanger, E. L. Myers, E. S. Strain and H. C. Middleton of Philadelphia.

MISSOURI PACIFIC.—An officer writes that there is no foundation for the report that the company will build an extension from near Caney, Kan., to run southwest into Oklahoma Territory. (Sept. 15, p. 650.)

NEW BRUNSWICK.—The building of the railroad of this line from New Brunswick west about 40 miles to the Grand Isle coal fields is to be begun immediately.

OMAHA, KANSAS CITY & EASTERN.—Three different surveys have been made, according to report, for the proposed extension from Quincy, Ill., east to Springfield. Reports will be heard from the engineers shortly and building is to be pushed. (July 28, p. 547.)

OREGON ROADS.—Grading is to be begun at once, according to report, on the line of the Booth-Kelly Lumber Co. of Eugene, to run from Henderson, on the Southern Pacific, northeast 22 miles up the Mohawk River. (Sept. 8, p. 633.)

PENNSYLVANIA.—The Cardington branch of the Philadelphia & Delaware County line is now building. (Sept. 15, p. 650.) It is about two miles long and extends from a connection with the P. & D. C., south of Marshall Road, to a terminus at Sixty-third and Market Sts., Philadelphia, near Millbourne Mills. (Official.)

PITTSBURGH, WESTMORELAND & SOMERSET.—Twelve miles of roadbed is reported completed ready for ties on the Byers-Allen Lumber Company's line from Ligonier, Pa., on the Ligonier Valley, to run southeast to Laurel Mountain. Captain N. Byers of Williamsport, Pa., is General Manager. (Aug. 4, p. 561.)

SEABOARD AIR LINE.—John Skelton Williams, President of this line, is quoted as saying that if satisfactory traffic arrangements cannot be made with the Richmond, Fredericksburg & Potomac, the company will build an independent line from Richmond, Va., north to Washington, D. C.

SOUTHERN.—Improvements are reported under consideration in the vicinity of Coal Creek, Tenn.

Press reports state that the company has decided to build the extension from Burgin, Ky., southeast about 115 miles, via Lancaster, to Jellico, Tenn. Surveys will be completed by Oct. 1, it is stated, and building begun by Jan. 1. (Aug. 11, p. 576.)

Except for two short stretches, the grading is practically completed on the extension from Cayce, S. C., just below Columbia, to run south 32 miles to Perry. It is to be completed about Nov. 15. (June 16, p. 439.)

SOUTHERN INDIANA.—The extension from Elnora, Ind., northwest 46 miles to Terre Haute, is reported practically completed to Linton. (June 23, p. 402.)

TERRE HAUTE & SOUTHWESTERN.—This company was incorporated in Illinois Sept. 18, with a capital stock of $50,000, to build a railroad from a point on the Indiana State line, near Terre Haute, southwest about 200 miles to a point on the Mississippi River in Alexander County. The incorporators and first Board of Directors are: B. F. Johnston and P. M. Johnston of St. Elmo, Ill.; J. W. Griswold of Litchfield, Ill.; W. T. Turner of Vandalia, Ill., and John H. Blessing of St. Louis, Mo.

VERA CRUZ & PACIFIC.—The contract for the 206 k.m. (128 miles) of this line, from k.m. 100, south to Santa Lucrecia, Mexico, on the National Tehuantepec, has been let to Joseph Qualey & Co., Cincinnati. (June 30, p. 485.) Work is to be begun within 30 days and the grading completed July 1, 1900. (Official.)

WHITE PASS & YUKON.—Grading is begun, according to report, on the extension from Bennett, N. W. T., northwest about 60 miles to White Horse Rapids. The road is to be ultimately extended to Fort Selkirk, in all about 240 miles from Skaguay, Alaska. (Sept. 1, p. 620.)

YANKTON, NORFOLK & SOUTHERN.—The organization of this company has been completed and bonds are to be issued at once for building the line. It is stated that an arrangement has been made for operating with the Great Northern. The line is to run from Norfolk, Neb., north 75 miles to Yankton, S. D. Of this 45 miles is graded and 25 miles of track laid. Graham & Roby of Norwalk, O., own the line. (Aug. 11, p. 576.)

GENERAL RAILROAD NEWS.

ATCHISON, TOPEKA & SANTA FE.—The committee appointed by the holders of the Atlantic & Pacific income bonds has agreed to receive settlement for the same on the basis of 2½ per cent. of their par value and the costs of the committee. (May 26, p. 380.)

ATLANTA & WEST POINT.—At the annual meeting on Sept. 12 a dividend of 25 per cent. was declared from accumulated and surplus earnings, payable Oct. 1.

BALTIMORE & OHIO SOUTHWESTERN.—The reorganization managers announce that securities of the old company may be deposited up to Oct. 4. New securities have been delivered since Sept. 20. (Sept. 15, p. 650.)

CAMPBELL HALL CONNECTING.—This property, which runs from the New Jersey State line to Pine Island, N. Y., 3.78 miles, has been bought, according to report, by the Lehigh & New England, which already operates it under lease.

GEORGIA.—August Belmont & Co., New York, authorize the following statement with reference to the lease of a half interest of this road by the Atlantic Coast Line, and the relationship of the road to the Louisville & Nashville and the Southern:

The papers have not been delivered yet, but the negotiations have been completed. The Atlantic Coast Line becomes a co-lessee of the property on equal terms with the Louisville & Nashville, which has for the past year been sole lessee. Originally the Central of Georgia was a co-lessee with the Louisville & Nashville, but forfeited its interest by failing to pay its part of the expense incurred. We then had a right to dispose of this half-interest in the Georgia RR. lease, and we have done so to the Atlantic Coast Line. It is not true that the Coast Line was acting for the Southern Railway in this transaction. The Atlantic Coast Line is an independent railway system. The Southern Railway does not own a dollar of its stock so far as is known. The Southern Railway, the Louisville & Nashville and the Atlantic Coast Line Co. are all independent corporations, and they are in no way drawn together by the terms of the lease of the Georgia RR. All reports to the effect that these railroads have in any way acquired control, one of the other, or have pooled traffic interests, are without the slightest foundation.

GREAT EASTERN.—This property was sold at public auction on Aug. 29 to Raymond Prefontaine and C. N. Armstrong, the only bidders. The company's proposed line forms a part of the Atlantic & Lake Superior, which has received $40,345 in subsidies from the Dominion Government. Only about seven miles is completed. (Aug. 25, p. 604.)

INTERCOLONIAL.—A settlement has been made as to the terms for the use of the track between St. John and Halifax by the Canadian Pacific. No official statement is made, but it is understood that the freight and passenger arrangements between the two companies will be continued for the present, and that the C. P. R. will be permitted to solicit freight into Intercolonial territory.

PEMBROKE SOUTHERN.—The management of this property on Sept. 18 was transferred to the Canada Atlantic. The road was built last year from Golden Lake, Ont., on the C. A., north 20½ miles to Pembroke.

PITTSBURGH, CLEVELAND & TOLEDO.—On account of the proposed reorganization of the Pittsburgh & Western, Simon Borg & Co. ask holders of P., C. & T. first mortgage 6 per cent. gold bonds of 1922, to deposit their bonds with the City Trust Co., New York, under a protective agreement.

SAN ANTONIO & GULF.—The company has begun suit in the Thirty-seventh District Court of Texas against the Farmers' Loan & Trust Co., as trustee, to obtain the cancellation of the $1,000,000 mortgage of Aug. 1, 1894. Only a very small portion of the bonds, it is stated, were issued.

UNION PACIFIC.—The company announces that an agreement has been made for the exchange of shares of its increased preferred and common stock, for similar shares of the Oregon Railroad & Navigation Co. The basis of exchange is share for share of stock of the same class, with a payment of $1 per share of the O. R. & N. preferred in equalization of dividends. Holders desiring to exchange or to deposit their shares with the Mercantile Trust Co., New York, or with the Old Colony Trust Co., Boston, must do so on or before Oct. 7.

The U. P. Co. also offers to exchange its first mortgage 4 per cent. gold bonds for the collateral trust non-cumulative series A 5 per cent. income bonds of the Oregon Short Line, at the same New York and Boston offices. A similar arrangement has been made for the exchange of collateral trust non-cumulative income B bonds of the O. S. L., for preferred stock of the U. P., to be deposited on or before Oct. 7.

TRAFFIC.

Chicago Traffic Matters.

Chicago, Sept. 20, 1899.

Unless executive officers of a number of the Western roads manifest more interest in the monthly meetings with members of the Interstate Commerce Commission, these conferences, that were inaugurated with such a hurrah, may be discontinued. At the last one held in this city several of the larger roads with general offices in Chicago were not represented at all. Commissioners Knapp and Yeomans expressed disappointment over the apparent lack of interest, and the railroad officers who did attend the conference openly express the opinion that unless all the roads are represented every time the original object of the conferences will be defeated. The first of these meetings in Washington was a representative one, nearly all of the lines being represented by their presidents. But subsequently traffic managers were sent, and now they have drifted down to freight agents and, in one or two instances, to assistants. There is no question that the officers of the railroads are losing interest in the meetings with the Commissioners. The last session in this city consumed little over one hour.

A number of important questions are down for consideration at the coming meeting of the Western Passenger Association in this city next week. Among the more important are: Redemption of return portion of excursion tickets found on the market; report of general baggage agents' committee on interchangeable excess baggage tickets; equalization of the trans-Atlantic steamship fare from Chicago via Boston, and application of short line rates through St. Louis to Texas points via Kansas City and vice versa.

The Milwaukee & St. Paul people have surprised the local passenger world by announcing a basing rate of $6 from St. Paul and Minneapolis on second-class tickets from the North Pacific Coast points. General Passenger Agent Heafford, in announcing the rate, says his action was made necessary by a similar rate put in by another St. Paul-Chicago line. Just what one of these roads is referred to cannot be learned, as neither the Northern Pacific nor the Great Northern will give Mr. Heafford the name of the road that started the trouble. Subsequently the Chairman of the Western Passenger Association requested a withdrawal of the rate by all the roads that put it in, but the proposition was negatived.

The war over packing house rates from the Missouri River to the southeast continues. The Burlington is determined to reduce the differential from Kansas City on this traffic and the lines from the latter place to the Southeast are just as determined that the packing house rate from there to Ohio River territory must be maintained 6 cents below the Omaha figures.

Officers of the Western roads have declined to make cash contributions to help defray the expenses of the fête to be held in this city during the first week in October, on the ground that it would establish a precedent that might be used against them by any town in the West for subsequent celebrations and gatherings of various kinds. In lieu of cash the railroads will further reduce rates for the local affair to a fare and a third for the round trip within a radius of 125 miles and one fare for the round trip outside this circle.

Among local passenger officers of the eastbound roads it is the general opinion that there will be a light movement to New York for the Dewey demonstration. The rate made is higher than the one in effect to the same city during the first of the month, and the celebration here, with prospects of Dewey putting in an appearance, will keep many from going East.

Western roads have put in effect the following proportional rates on export grain, carloads, from Mississippi River east bank points, East St. Louis to East Dubuque, inclusive, to Baltimore, Newport News and Norfolk: Barley, corn, rye and wheat, 13½ cents per 100 lbs., and oats, 15½ cents. To maintain the differential of 4½ cents below the through proportional export rates obtainable from southwestern Missouri River points to Newport News or Norfolk, each road to the Gulf has declared the intention to establish proportional rates of 16 cents on barley, corn and rye, 18 cents on wheat and 18 cents on oats, in carloads, for export, from southwestern Missouri River points to New Orleans, Port Arthur and Galveston. It is reported that the Illinois Central is now taking grain from this district to New Orleans at 12 cents.

At the next meeting of the Western Freight Association another attempt will be made to do away with all passes to shippers.

Regarding the Interstate Commerce Commission's recent ruling in the export and domestic grain rate case, Freight Commissioner Hyland, of the Chicago Board of Trade, has this to say:

"While the decision does not grant quite all we had contended for, it is still a matter for congratulation to the members of the Board of Trade that the Commission should coincide so nearly with our views in regard to the traffic rights of the grain and flour shippers of Chicago and Illinois points tributary to this market. In the matter of export grain, we suggested that the inland rate to the seaboard should include the cost of elevation into the ship in the harbor of exportation, in order, if possible, to remove the temptation of concessions in this charge to the Eastern exporter, and for the purpose also of equalizing the inland rates upon grain and flour intended for export, as the inland rate upon flour delivers the property f. o. b. ship; but in lieu of this, the Commission allows export wheat a differential of not to exceed 2 cents per 100 lbs. in the inland rate, which covers the cost of elevation into the ship, and thus practically equalizes the inland rates upon wheat and flour for export."

Homeseekers' excursions are to be re-established in the territory of the Central Passenger Association. As a matter of fact, the rates have been pretty generally quoted by all the Central Passenger Association lines for two or three months. The agreement of last spring, which provided for an abolition of these rates, was adhered to for a time, but the roads that extend into the Western Passenger Association territory and the Illinois Central, which refused to go into the agreement because it had so much Southern land on the market, soon broke away from the compact, and gradually the rates have crept back into the entire territory. The association is now in session to authorize their general application.